Date: 10 December 2001

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 200-TW-1&2 - Soil Sampling

Subject: Inorganics - Data Package No. H1409-LLI (SDG No. H1409)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	С	See note 1
B125Y4	6/27/01	Soil	C	See note 1

¹⁻ ICP metals by 6010B; mercury by 7470A.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualiflers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times for ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is six (6) months for ICP metals and 28 days for mercury.

All holding times were acceptable.



Blanks

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the target required quantitation limit (TRQL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the TRQL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130-70% for TOC) and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

Precision

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35% for soil samples. If RPD values are out of specification and the sample concentration is greater than five times the TRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus 2 times the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

Analytical Detection Levels

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TRQL.

Completeness

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 353.9%, the calcium result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.3%, the mercury result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 129.1%, the bismuth result in sample B125X2 was qualified as an estimate and flagged "J". Due to an RPD of 64%, the nickel result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, February 2001.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Nickel	J	B125Y4	RPD
Calcium Mercury Bismuth	J	B125X2	Matrix spike recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HA				4													
Laboratory: Lionville L	aboratory inc.			4													
Case:	SDG: H1					, .		,									
Sample Number		B125X2		B125Y4		├		 		<u> </u>				 		 	
Remarks						1		<u> </u>		<u> </u>		↓		ļ		 	
Sample Date		06/27/01		06/27/01				<u> </u>		<u> </u>	-	<u> </u>	1	 	1	 -	T6-
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Bismuth		198		8.2	L	<u> </u>	_			ļ <u>.</u>			1-	 	↓		╀—
Calcium		8130		7980		<u> </u>		 _		<u> </u>		ļ	╄.	<u> </u>	╄	.	┼
Cadmium		0.46		0.44	<u>u</u>	<u> </u>		Ļ		<u> </u>	—	<u> </u>	—	<u> </u>	↓_	_	↓—
Chromium	1	27.3		8.9	<u> </u>	<u> </u>		<u> </u>		ļ	┷-		\	 	↓_		
Соррег	2.5			12.9	<u> </u>	<u> </u>		ļ		ļ		ļ	_	Ļ	_	<u> </u>	4—
Iron		19200		20200				<u> </u>		<u></u>							4_
Mercury	0.2	0.18	J_	0.02	U	L		Ĺ		<u> </u>			<u> </u>	 	<u> </u>		┵—
Potassium		1720	Γ.	771		<u> </u>		I		<u> </u>			<u> </u>	ļ	1	1	1
Magnesium		5460		4080	Γ.,	<u> </u>		L <u>.</u>		<u> </u>			1	<u> </u>			ᆚ—
Manganese		318		272		1		<u> </u>				ļ	↓	<u> </u>	<u> </u>		4_
Molybdersum		10.6	U	10.3	Ü			<u> </u>		<u> </u>	<u> </u>	(↓_		1_	<u> </u>	4_
Sodium		1510		832		<u>.L</u>		<u> </u>		<u> </u>		1		ļ <u> </u>	1		4
Nickel	4	38.0	E	8.7		<u> </u>		<u> </u>		<u> </u>	<u> </u>		<u> </u>	 	<u> </u>		4
Lead	10	11.6		5.0		1		<u> </u>		<u> </u>		<u> </u>	↓_	 _	╀	<u> </u>	+
Vanadium		39.8		52.3		<u> </u>		<u> </u>		<u> </u>		<u> </u>	 	<u> </u>	╀		ֈ
Zine		39.9		38.4	U_	<u> L</u>				<u> </u>		<u> </u>	↓	<u> </u>	Т		
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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 07/26/01

CLIENT: THUMANFORD B01-058-H1409 WORK ORDER: 11343-606-001-9999-00 LVL LOT 8: 0107L228

					reporting	dilution
Bample	SITE ID	Analyte	RESULT	UNITS	LIMIT	PACTOR
		*********	****	229548		****
-001	B125Y4	Silver, Total	0.29 u	NG/KS	0.29	1.0
		Aluminum, Total	5900	MG/KG	1.7	1.0
		Bismuth, Total	6.2	NG/103	5.7	1.0
		Calcium, Total	7960	MG/KG	2.7	1.0
		Cadmium, Total	0.44 12	NG/KG	0.44	1.0
		Chromium, Total	\$.5	MG/KG	0.40	1.0
		Copper, Total	12.9	NG/KG	0.25	1.0
		Iron, Total	10200	NG/KG	1.1	1.0
		Mercury, Total	0.02 u	HG/KG	0.02	1.0
		Potassium, Total	771	MG/KG	44.6	1.0
		Magnesium, Total	4060	NG/KG	2.7	1.0
		Manganese, Total	272	NG/KG	0.19	1.0
		Holybdenum, Total	10.3 u	mg/kg	10.3	1.0
		Sodium, Total	932	MG/KG	2.0	1.0
		Nickel, Total	0.7 J	NG/KG	1.2	1.0
		Lead, Total	5.0	MG/KG	32	1.0
		Vanadium, Total	52.3	NG/RG	0.44	1.0
	4	Binc, Total	38.4	MG/KG	0.30	1.0

12/4/01

PAF FOL #1 0701FSST

REPORTING

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1.0	94.0	DX/DH	u 24.0	Cadalum, Total		
O'T	14.0	101/101	£.TS	Chromium, Total		
0.L	SE'O	601/0H	4.44	Copper, Total		
0.1	T.T	801/8H	00261	Iron, Total		
0.1	20.0	201/94	E. 22.0	Mercury, Total		
0.1	0.35	## \KG	OELT	Potessium, Total		
0.1	٤.٦	MO/KG	0975	'fador , mušaengeh		
0,1	61.0	EM/DH	872	Nenganese, Total		
0.1	300	DX/OH	n 9'07	Molybdenum, Total		
0.1	I.S	ed/en	STAT	Sodium, Total		
0.1	z· t	50(/5M	0.85	Mickel, Total		
0°T	E. E	DX/DM	77'6	Lead, Total		
2.0	34.0	DOL/DM	3.45	Venadium, Total		
0'T	£€.0	DX/DH	2. e£	Aine, Total		

NOWN ONDER! 17343-606-001-3333-00

12/4/01

DIPALION

THOMOSYNICE DYLY BONNINK KENONL 01/50/07

Lionville Labsboratory, Inc.

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Analytical Report

Client: TNU-HANFORD B01-058

LVL#: 0107L228, 231

SDG/SAF#: H1409/B01-058

W.O.#: 11343-606-001-9999-00

Date Received: 07-05-01

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 soil samples.

- 2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.
- 3. All analyses were performed within the required holding times.
- 4. The cooler temperatures have been recorded on the Chain of Custodies.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
- 10. The matrix spike (MS) recoveries for 7 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
- 11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration levels for the following analytes:

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of pages.



		PDS	PDS
Sample ID	Element	Concentration (ppb)	% Recovery
B125Y4	Aluminum	20,000	106.1
	Iron	20,000	89.0
B125X2	Aluminum	20,000	91.5
	Bismuth	5,000	87.1
	Calcium	20,000	93.7
	Iron	20,000	61.0

- 12. The duplicate analyses for 10 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

lain Daniels

Deputy Laboratory Manager

Lionville Laboratory Incorporated

gmb/m07-228, 231

37-31-01

Date





Bechtel Hanfor	rd Inc.	1	CHAIN OF CUST	UN Y/S/	WIL	E ANAU.	مدن د	171	vulu.					
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Bechtel Hanford Inc.	CHAIN OF CUST	ODY/SAN	APLE A	<u>Nalysis</u>	REQUEST	[]	B	41-6CU-1	-	** •
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						/		 		-
Received Rec	Pillored in C 7/5/61 Displaced in C 7/5/61 Displaced in C 7/5/61 Displaced in C 7/5/61	tertime 7.4 0824 2.0 1 tortime /0 5 tortime Title	(1) ICP Me (Add-on) (1) (2) IC Ani: NO2/NO3 - (3) Semi-V (4) ICP Me Iron, Lond, I	Bismath, Lord; Jone - 300,0 (Chlo - 353.1; Total Cys /OA 2770A (Aviotale - 6010TR (C Magnesium, Mean Add an Hedinary (California - 1601) Add an Hedinary (California - 1601)	L) (Cadmium, Chrom Vercury - 7470 - (CV)	k Chromi Nitrita, F 60; pH (3 photo); T , Bismoth Nickel, P	em Hest - 7196 hosphete, Sulfate nil) - 9045 Mi-Diosal Range I, Cadminan, Calci ptastitun, Silver, i	; Assencesia - 35 WTPH-D on, Chroméun, Sodium, Vanadiu 184, Panajana 1	0.3; Copper, m, Zinc)	Maleix seali sub-delles sp-dell se-delles sp-dell se-delles sp-dell sp-delles
SECTION FINAL SAMPLE Disposil Method DISPOSITION		·		Disposed By				D	ato/Time	



DATE RECEIVED: 07/05/01 LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
SILVER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	s	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	s	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	Ş	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	s	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	s	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0425	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	s	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 ,	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP '	s	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

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LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANAGE POST	001 MG		017.0426	05/07/03	07/14/01	07/22/01
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01		07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 REP	S	01L0426	`06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 REP	s	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	s	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1	BS	s	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1		S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORTORY	LC1	BS	s	01L0426	n/a	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1		s	01L0426	n/a	07/14/01	07/23/01
BISMUTH, LCS	LC1	BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1		s	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1	BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MBl		S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1	BS	Ş	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1		S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1	BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1		S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1	BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1		S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1	BS	S	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1		S	01L0426	n/a	07/14/01	07/23/01

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LVL LOT # :0107L228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	s	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	n/a	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	s	01L0426	N/A -	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	Š	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY ZINC, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01

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CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
SILVER, TOTAL	001	s	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
SILVER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 REP	s	01L0426	06/27/01	07/14/01	07/23/01
ALUMINUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
BISMUTH, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL REP	001 REP	s	01L0426	06/27/01	07/14/01	07/25/01
BISMUTH, TOTAL SPIKE	001 MS	s	01L0426	06/27/01	07/14/01	07/25/01
CALCIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CALCIUM, TOTAL	001 MS	8	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001	s	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CADMIUM, TOTAL	001 MS	S	011.0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
CHROMIUM, TOTAL	001 MS	S	01LQ426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
COPPER, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001	s	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
IRON, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MERCURY, TOTAL	001	s	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 REP	S	01C0228	06/27/01	07/23/01	07/23/01
MERCURY, TOTAL	001 MS	S	01C0228	06/27/01	07/23/01	07/23/01
POTASSIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
POTASSIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01
MAGNESIUM, TOTAL	001 MS	s	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
MANGANESE, TOTAL	001 REP	S	01L0426	06/27/01	07/14/01	07/23/01

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CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MANGANESE, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
MOLYBDENUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 RE	P S	01L0426	06/27/0i	07/14/01	07/25/01
MOLYBDENUM, TOTAL	001 MS	s	01L0426	06/27/01	07/14/01	07/25/01
SODIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 RE	P S	01L0426	06/27/01	07/14/01	07/23/01
SODIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 RE	SP S	01L0426	06/27/01	07/14/01	07/23/01
NICKEL, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 RE	P S	01L0426	06/27/01	07/14/01	07/23/01
LEAD, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 RE	P S	01L0426	06/27/01	07/14/01	07/23/01
VANADIUM, TOTAL	001 MS	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001	S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 RE	RP S	01L0426	06/27/01	07/14/01	07/23/01
ZINC, TOTAL	001 MS	S S	01L0426	06/27/01	07/14/01	07/23/01

LAB QC:

SILVER LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
SILVER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ALUMINUM LABORTORY	LC1 BS	S	01L0426	n/a	07/14/01	07/23/01
ALUMINUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
BISMUTH, LCS	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
BISMUTH, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
CALCIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CALCIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CADMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
CHROMIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
COPPER LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
COPPER, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
IRON LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
IRON, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01

DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY LABORATORY	LC1 BS	s	01C0228	N/A	07/23/01	07/23/01
MERCURY, TOTAL	MB1	S	01C0228	N/A	07/23/01	07/23/01
POTASSIUM LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
POTASSIUM, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MAGNESIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
MANGANESE, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
MOLYBDENUM LABORATOR	LC1 BS	S	01L0426	N/A	07/14/01	07/25/01
MOLYBDENUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/25/01
SODIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
SODIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
NICKEL LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
NICKEL, TOTAL	MB1	s	01L0426	N/A	07/14/01	07/23/01
LEAD LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
LEAD, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM LABORATORY	LC1 BS	S	01L0426	N/A	07/14/01	07/23/01
VANADIUM, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01
ZINC LABORATORY	LC1 BS	s	01L0426	N/A	07/14/01	07/23/01
ZINC, TOTAL	MB1	S	01L0426	N/A	07/14/01	07/23/01

Appendix 5 Data Validation Supporting Documentation

WHC-SD-EN-SPP-002, Rev. 2

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

A D-TW- CLP/GFAA SW-846/GFAA X B12 AGE COMPLETEN	ANALYSES CIPMO SEY-846MG	SDG: // PERFORMED □ CLP/Cyanide □ SW-848 Cyanide		Decol
CLP/GFAA GSW-846/GFAA X B 12 AGE COMPLETEN	ANALYSES CIPMO SEY-846MG	SDG: // PERFORMED CLP/Cyanida Cl 8W-848 Cyanida	DATE: 72	Deco/
CLP/GFAA SW-846/GFAA X B 12 AGE COMPLETEN	ANALYSES CLPMG SEY-846MG	SDG: // PERFORMED □ CLP/Cyanide □ SW-848 Cyanide	1409	0
SW-846/GFAA IX BIZ AGE COMPLETEN	CLPMg SX2 SX2	PERFORMED CLP/Cyanide Cl 8W-846 Cyanide	0	0
SW-846/GFAA IX BIZ AGE COMPLETEN	CLPMg SX2 SX2	CLP/Cyanide Cl 8W-846 Cyanide	a	0
SW-846/GFAA IX BIZ AGE COMPLETEN	SXZ	Cyanide Residual Control Cont	a	0
IX BIZ	5X2 .	Cyanide		
AGE COMPLETEN		Reserved to the second	B12544	Say
AGE COMPLETEN				
	RESS AND CASI			
rative preser	documentationt?	on present?	<i></i>	Yes No
	acceptable?			res No
1	TMES	TMES olding times acceptable?	TMES	TMES Iding times acceptable?

000025

WHC-SD-EN-SPP-002, Rev. 2

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS	
Were initial calibrations performed on all instruments? Yes No (N/)	
Are initial calibrations acceptable? Yes No N/A	
Are ICP interference checks acceptable? Yes No N/A	
Were ICV and CCV checks performed on all instruments? Yes No N/A	
Are ICV and CCV checks acceptable? Yes No N/A	
Comments:	
4. BLANKS	
Were ICB and CCB checks performed for all applicable analyses? Yes No (N/A)	
Are ICB and CCB results acceptable?	
Were preparation blanks analyzed?	
Are preparation blank results acceptable? Yes No N/A	
Were field/trip blanks analyzed? Yes No N/A	
Are field/trip blank results acceptable? Yes No N/A Comments:	
5. ACCURACY	
Were spike samples analyzed?	く
Are spike sample recoveries acceptable? Yes The NA NO	y
Were laboratory control samples (LCS) analyzed?	j
Are LCS recoveries acceptable? Yes No The Log	,
Comments: 14 - 01(411.5) For (1956) OK	
(353.7) calcum (353.7) (ron (2993) Hy (34.3)	
Bromuth (129.1)	

WHC-SD-EN-SPP-002, Rev. 2

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION										
Were laboratory duplicates analyzed? (es)	No N	I/A								
Are laboratory duplicate samples RPD values acceptable? Yes		I/A								
Were ICP serial dilution samples analyzed? Yes Are ICP serial dilution &D values acceptable? Yes										
Comments: YY N. (6470) 956 (1570)		1/A)								
ab (157a) e										
		_								
7. FURNACE AA QUALITY CONTROL		_								
Were duplicate injections performed as required? Yes	No N	ı/λ								
Are duplicate injection %RSD values acceptable? Yes	No N	ا _A /۸								
Were analytical spikes performed as required? Yes	No N	, N/A								
Are analytical spike recoveries acceptable? Yes	1	·/A								
Was MSA performed as required? Yes	1	Y/A								
Are MSA results acceptable? Yes	1	V/A/								
Comments:		ン ー ー								
8. REPORTED RESULTS AND DETECTION LIMITS		<u> </u>								
		u /a								
Are results reported for all requested analyses?	NO P	兴								
Are all results supported in the raw data? Yes	No (兴								
Are results calculated properly? Yes	No (Y A								
Do results meet the CRDLs?	No N	N/A 								

well 000027

Appendix 6

Additional Documentation Requested by Client

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: THUHANPORD B01-058 H1409 MORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L228

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	rrporting Limit	DILUTION FACTOR
	**********		******	*****	Thereses	=======
BLANKI	01L0426-MB1	Silver, Total	0.28 u	MG/KG	0.28	1.0
		Aluminum, Total	1.7 u	NG/KG	1.7	1.0
		Bismuth, Total	5.6 u	NG/KG	5.6	1.0
		Calcium, Total	2.6 u	MG/KG	2.6	1.0
		Cadmium, Total	0.43 u	MG/KG	0.43	1.0
		Chromium, Total	0.39 u	ng/kg	0.39	1.0
		Copper, Total	0.24 u	MG/KG	0.24	1.0
		Iron, Total	1.1 u	NG/KG	1.1	1.0
		Potassium, Total	43.4 u	MG/KG	43.4	1.0
		Nagnesium, Total	2.6 u	MG/KG	2.6	1.0
		Hanganese, Total	0.18 u	Mg/KG	0.16	1.0
		Molybdenum, Total	16.0 u	NG/KG	10.0	1.0
		Sodium, Total	3.3	NG/KG	1.9	1.0
		Nickel, Total	1.1 u	NG/KG	1.1	1.0
		Lead, Total	3.1 u	NG/KG	3.1	1.0
		Vanadium, Total	0.43 u	MG/KG	0.43	1.0
		Einc, Total	6.49	NG/KG	0.29	1.0
BLANKI	01C0228-MB1	Nercury, Total	0.02 u	NG/KG	0.02	1.0

Lionville Debaboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L231

					REPORTING	DILUTION
Bample	SITE ID	ANALYTE	RESULT	units	LIMIT	FACTOR
~~~~~	<b>医外部中央电影图图图图点的电影的影响等等</b>	****************	220000#4		*******	
BLANKI	01L042 <b>6-MB</b> 1	Silver, Total	0.28 u	MG/KG	0.20	1.0
		Aluminum, Total	1.7 u	NG/KG	1.7	1.0
		Bismuth, Total	5.6 u	ng/kg	5.6	1.0
		Culcium, Total	2.6 u	NG/KG	2.6	1.0
		Cadmium, Total	0.43 u	NG/KG	0.43	1.0
		Chromium, Total	0.39 u	MG/KG	0.39	1.0
		Copper, Total	0.24 u	HG/KG	0.24	1.0
		Iron, Total	1.1 u	NG/KG	1.1	1.0
		Potessium, Total	43.4 u	NG/KG	43.4	1.0
		Magnesium, Total	2.6 U	HG/KG	2.6	1.0
		Manganese, Total	0.18 u	MG/KG	0.18	1.0
		Holybdenum, Total	10.0 u	NG/KG	10.0	1.0
		Sodium, Total	3.3	MG/KG	1.9	1.0
		Nickel, Total	1.1 u	NG/KG	1.1	1.0
		Lead, Total	3.1 u	NG/KB	3.1	1.0
		Vanadium, Total	0.43 u	MG/KG	0.43	1.0
		Zinc, Total	0.89	NG/KG	0.29	1.0
BLANK1	01C0228-NB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

# INOSGYNICS YCCHMYCL MEDOML 03/36/07

TAP TOL #: 0701537

MOSK ONDER: 17343-606-007-3333-00 CPIENI: IMMPYNLOND B07-068 H7603

0.1	7. tot	0.62	4.65	R. EE	Tine, Total		
0.1	6.011	0.64	8.40	9.86	Vanadium, Total		
0.τ	0.68	0.52	9.11	9.22	Lead, Total		
0.τ	114.5	0.52	0.85	4.06	Mickel, Total		
0 · I	1.301	3650	0151	4330	Sodium, Total		
0.τ	0.56	70€	u 3.01	8.76	Molybdenum, Total		
0 · t	47. AGI	0, 62	<b>378</b>	***	Hanganese, Total		
0 · t	Z.60I	3620	0915	0960	Megnesium, Total		
0 · T	E.EQT	3620	7130	09++	Potassium, Total		
<b>σ·τ</b>	6.47	Lt.O	\$T.0	£E.O	Herchry, Total		
0.τ	2042 +	706	73500	37300	Izon, Total		
a·t	8,56	\$192	6.11	3.35	Copper, Total		
Q-T	1.66	31'3	£.72	6.83	Chromium, Total		
σ.1	7.88	€.8	npp 10	4.4	Cadmium, Total		
0.t	e.eze	3620	OETS	00 <b>5</b> LT	Calcium, Total		
0.1	1.621	230	796	9#3	Bismuth, Total		
0.1	*4.968	373	0756	00401	Aluminum, Total		
0.1	5.56	€.8	40£,0	6.4	Silver, Total	BISAXS	T00-
********	****			4222242	%=====================================	******	*****
BYCLOS (BBK)	RECOV	MOUNT	TAIUSER	STAWYS	STYLIAMA	di stia	EJ4MV8
DIFFILION		CENTIES	INITIME	SPIKED	•		
		_					

### Lionville Lababoratory, Inc.

### INORGANICS ACCURACY REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L228

			SPIKED	initial	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	Pactor (SPK)
		**********	*****				
-001	B125Y4	Silver, Total	4.9	0.29u	5.1	96.1	1.0
		Aluminum, Total	6750	6900	204	411.5*	1.0
		Bismuth, Total	489	8.2	514	93.6	1.0
		Calcium, Total	10100	7980	2570	82.3	1.0
		Cadmium, Total	4.9	0.44u	5.1	96.1	1.0
		Chromium, Total	30.2	8.9	20.€	103.4	1.0
		Copper, Total	36.7	12.9	25.7	92.6	1.0
		Iron, Total	22200	20200	103	1956 *	1.0
		Mercury, Total	0.16	0.02u	0.16	100	1.0
		Potassium, Total	3150	771	2570	92.6	1.0
		Magnesium, Total	6660	4080	2570	100.6	1.0
		Hanganese, Total	325	272	51.4	102.7*	1.0
		Molybdenum, Total	95.7	10.3 u	103	93.1	1.0
		Sodium, Total	3290	832	2570	95.0	1.0
		Nickel, Total	62.1	6.7	51.4	103.9	1.0
		Lead, Total	52.9	5.0	51.4	93.2	1.0
		Vanadium, Total	105	\$2.3	. 51.4	102.3	1.0
		Binc, Total	89.2	38.4	51.4	98.8	1.0
					*		

# INORGANICS PRECISION REPORT 07/26/01

Prountile Lababoratory, Inc.,

TAP TOL : 0101F331

NOKK OKDES: 77343-606-001-3333-00 CLIENT: INDHANDOND BOT-026 H1603

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0.1	٤٠٤	6.8£	0.85	Mickel, Total	•	
7.0	L.8	069T	TRTO	Sodium, Total		
0.1	ЭМ	n a or	n 9.01	Molybdenum, Total		
σ. τ	. WITT	386	OTE	Hanganese, Total		
7.0	ε. τ	0755	0979	Magnesium, Total		
0,İ	L't	7660	1150	Potassium, Total		
0.1	15.0	#T'0	81.0	Hercury, Total		
0.1	70'3	37300	T3500	Ixon, Total		
0.1	3.6	11.6	4.11	Copper, Total		
0.1	7'2	6.92	E. YE	Chromium, Total		
0.1	MC	n99'0	139 °C	Cadmium, Total		
G. £	12.6	0296	OETO	Calcium, Total		
0. τ	1.72	360	161	Bismuth, Total		
0.1	€.€	0986	0146	fact , municula		
0°T	ЯС	woc.o	40E.0	Silver, Total	BISEXS	- COTREP
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### Licaville Lababoratory, Inc.

# INORGANICS PRECISION REPORT 07/26/01

CLIENT: TNUHANFORD B01-058 H1409 WORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L228

			INITIAL				dilution
SAMPLE	SITE ID	ANALYTE	RESULT	REPLICATE	RPD		PACTOR (REP)
		=======================================		*******			
-001REP	B125Y4	Silver, Total	0.29u	0.45	ЖC	200	1.0
		Aluminum, Total	5900	6750	13.4		1.0
		Bismuth, Total	8.2	5.7 u	JAC	20.	1.0
		Calcium, Total	7960	8380	4.9		1.0
		Cadmium, Total	9.44u	0.44u	NC		1.0
		Chromium, Total	8.9	11.9	28.8		1.0
		Copper, Total	12.9	15.2	16.4		1.0
		Iron, Total	20200	26300	26.4		1.0
		Mercury, Total	0.02u	0.02u	NC		1.0
		Potassium, Total	771	860	10.9		1.0
		Magnesium, Total	4080	4910	18.6		1.0
		Hanganese, Total	272	368	30.1		1.0
		Holybdenum, Total	10.3 u	10.3 u	, MC		1.0
		Sodium, Total	832	960	14.3		1.0
		Nickel, Total	8.7	17.0	64.6		1.0
		Lead, Total	5.0	7.9	45.0		1.0
		Vanadium, Total	52.3	68.7	27.1		1.0
		Zinc, Total	38.4	47.8	21.8		1.0

MB 7/30/01

Date:

10 December 2001

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

200-TW-1&2 - Soil Sampling

Subject:

Diesel Range Organics - Data Package No. H1409-LLI (SDG No. H1409)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	С	Diesel Range Organics
B125Y4	6/27/01	Soil	С	Diesel Range Organics
B125X2RE*	6/27/01	Soil	С	Diesel Range Organics
B125Y4RE*	6/27/01	Soil	С	Diesel Range Organics

^{* -} Both samples were re-extracted and re-analyzed.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### DATA QUALITY OBJECTIVES

# Holding Times

Analytical holding times for diesel range organics is assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements is 14 days to extraction and 40 days for analysis.

The re-extraction took place outside QC limits and the associated results 000001

(B125X2RE and B125Y4RE) were qualified as estimates and flagged "J".

All other holding times were acceptable.

### Blanks

# Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Target Required Quantitation Limit (TRQL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the TRQL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

### Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

# Accuracy

# Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J".

Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If surrogate recoveries are out of control limits (50-100%) or outside laboratory control limits, all associated sample results greater than the target required quantitation limit (TRQL) are qualified as estimates and flagged "J". Sample results less than the TRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the TRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R".

Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". The MS recovery was also outside QC limits (undetected).

All other surrogate recovery results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to low MSD recoveries (0% and 37%) and prior qualification, no RPD was calculated for sample B125X2.

All other MS/MSD results were acceptable.

### Field Duplicate Samples

No field duplicates were submitted for analysis.

### Analytical Detection Levels

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQL to ensure that laboratory detection levels meet the required criteria. All undetected diesel range organics results exceeded the TRQL. Under the BHI statement of work, no qualification is required.

### Completeness

Data package No. H1409-LLI (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 75%.

#### MAJOR DEFICIENCIES

Due to a surrogate recovery of 0%, the diesel range organics result in sample B125Y4 was rejected and flagged "R". Rejected data is unusable and should not be reported.

### **MINOR DEFICIENCIES**

The re-extraction took place outside QC limits and the associated results (B125X2RE and B125Y4RE) were qualified as estimates and flagged "J". Due to a surrogate recovery of 10%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Due to matrix spike recovery of 0%, the diesel range organics result in sample B125X2 was qualified as an estimate and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All undetected diesel range organics results exceeded the TRQL. Under the BHI

statement of work, no qualification is required.

### REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, February 2001.

## Appendix 1

**Glossary of Data Reporting Qualifiers** 

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

## **DATA QUALIFICATION SUMMARY**

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE_1_OF_1_
COMMENTS:	,		
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Diesel range organics	J	B125X2RE, B125Y4RE	Holding time
Diesel range organics	J	B125X2	Matrix spike recovery
Diesel range organics	J	B125X2	Surrogate recovery
Diesel range organics	R	B125Y4	Surrogate recovery

## Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: BECHTEL-HANFORD				]											
Laboratory: Lionville Laboratory In	o.														
Case:	SDG: H	1409		l											
Sample Number		B125X2		B125Y4		B125X2RE		B125Y4R	<u>E</u>						
Remarks		_													
Sample Date		6/27/01		6/27/01		6/27/01		6/27/01							
Extraction Date		7/6/01		7/6/01		7/20/01		7/20/01							
Analysis Date		7/10/01		7/10/01		7/26/01		7/26/01							
Diesel Range Organics	CROL						Q			Result	Q	Result	Q	Result	Q
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# Lionville Laboratory, Inc. DIESEL RANGE ORGANICS BY GC

DIESEL RANGE ORGANICS BY GC Report Date: 07/27/01 10:32

RFW Batch Number:					•		
	Cust ID:	B125X2	B125X2	B125X2	B125X2	B125X2	B125X2
Sample	RFW#:	001	001	001 MS	001 MS	001 MSD	001 MSD
Information	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1,00	1.00	1.00
	Units:	mg/kg	mg/kg Reprep	mg/kg	mg/kg REPREP	mg/kg	mg/kg REPRBP
	p-Terphenyl	10 * *	78 🕻	0 * *	86 <b>t</b>	4 * *	88 \$
Diesel Range Organi	ics	13 🎞			72 <b>*</b>	37 <b>t</b>	69 <b>1</b>
Diesel Range Organi	Cust ID:				···		
	Cust ID:	13 🎞	12.8 ປຸ	J v • •	72 🕏		
Sample	Cust ID:	13 J	12.8 U.	J U + %	72 t		
Diesel Range Organi Sample Information	Cust ID: RFW#:	BLK 01LE0801-MB1	BLK BS 01LR0801-MB1	BLK 01LE0871-MB1	72 % BLE BS 01LE0871-NB1		
Sample	Cust ID: RFW#: Matrix:	BLK 01LE0801-MB1 SOIL	BLK BS  01LR0801-MB1 SOIL	BLK 01LE0871-MB1 SOIL	72 % BLR BS 01LE0871-MB1 SOIL		
Sample	Cust ID:  RFW#:  Matrix:  D.F.:	BLK  01LE0801-MB1 SOIL 1.00	BLK BS  01LR0801-MB1 SOIL 1.00	BLK  01LE0871-MB1  SOIL  1.00	72 % BLR BS 01LH0871-MB1 SOIL 1.00		
Sample	Cust ID:  RFW#:  Matrix:  D.F.;  Units:	BLK  01LE0801-MB1 SOIL 1.00 mg/kg	12.8 U.  BLK BS  01LR0801-MB1 SOIL 1.00 mg/kg	BLK 01LE0871-MB1 SOIL 1.00 mg/kg	72 \$ BLE BS  01LE0871-MB1 SOIL 1.00 mg/kg		69

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

perspelor

# Lionville Laboratory, Inc. DIESEL RANGE ORGANICS BY GC

Report Date: 07/27/01 10:42

Client: TNUHANFORD B01-058 H1409 Work Order: 11343606001 Page: 1 RFW Batch Number: 0107L228 B125Y4 **B125Y4** B125Y4 B125Y4 B125Y4 **B125Y4** Cust ID: 001 001 MS 001 MS 001 MSD 001 MSD Sample RFW#: 100 SOIL Information Matrix: SOIL SOIL SOIL SOIL SOIL 1.00 D.F.: 1.00 1.00 1.00 1.00 1.00 mg/kg Units: mg/kg mg/kg mg/kg mg/kg mg/kg REPREP REPREP REPREP 0 * * 1 * * 11 * * 99 89 87 p-Terphenyl 12.4 UR 12.7 UJ 76 72 66 87 ¥ * Diesel Range Organics Cust ID: BLK BLK BS BLK BLK BS Sample RFW#: 01LR0801-MB1 01LE0801-MB1 01LR0871-MB1 01LE0871,-MB1 Information Matrix: SOIL SOIL SOIL SOIL D.F.: 1.00 1.00 1.00 1.00 Units: mg/kg mg/kg mg/kg mg/kg p-Terphenyl 12 * * 0 + + 89 108 . Ł Diesel Range Organics 12.0 U 59 💺 12.0 U 87 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

12/2/0

## Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



### **Analytical Report**

Client: TNU HANFORD B01-058

LVL#: 0107L231

SDG/SAF#: H1405/B01-058

W.O #: 11343-606-001-9999-00

7/3/6/ Date

Date Received: 07-05-01

### **DIESEL RANGE ORGANICS**

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25, 26-01. The analysis met the intent of method WTPH-D.

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 6. All blank spike recoveries were within acceptance criteria.
- 7. One (1) of four (4) matrix spike recoveries was outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Iain Daniels /

Deputy Laboratory Manager

Lionville Laboratory Incorporated

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of

the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

12/2



### **Analytical Report**

Client: TNU HANFORD B01-058

LVL#: 0107L228

SDG/SAF#: H1409/B01-058

W.O #: 11343-606-001-9999-00

Date Received: 07-05-01

### **DIESEL RANGE ORGANICS**

One (1) soil sample was collected on 06-27-01.

The sample and its associated QC samples were prepared on 07-06-01, re-extracted on 07-20-01, and analyzed according to Lionville Laboratory OPs based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 07-10,25,26-01. The analysis met the intent of method WTPH-D.

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for the analysis were met. Due to low surrogate recoveries, the sample was re-extracted outside of hold time. Both the original and the re-extracted results have been reported. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Five (5) of ten (10) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- All blank spike recoveries were within acceptance criteria. 6.
- All matrix spike recoveries were within acceptance criteria. 7.
- I certify that this sample data package is in compliance with SOW requirements, both 8. technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

Deputy Laboratory Manager

Lionville Laboratory Incorporated

R:\share\dro\07-228.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of

the analytical data. Therefore, this report should only be reproduced in its entirety of 9 pages.

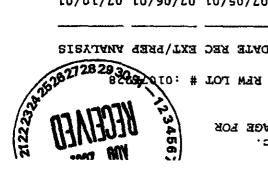
7/31/01



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work cert

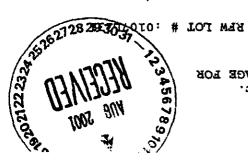
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TO/SZ/LO	T0/0Z/L0	A/N	A/N	OTTEOSAT	ទ		TEM	BLK
TO/OT/LO	T0/90/L0	A\N	A/N	OTFEOSOT	S	SE	WBT I	ыск
10/01/40	TO/90/LO	A\N	A\N	OTFEOSOT	s		WBI	BLK
								LAB QC:
T0/9Z/L0	T0/0Z/L0	T0/S0/L0	T0/LZ/90	OTEROSAT	s	VED KI	1 TOO	BISZK#
TO/OT/LO	το/90/40	T0/S0/L0	T0/LZ/90	OTPEOSOT	S	asi	OOT I	BTS2X#
T0/9Z/L0	01/20/0T	TO/SO/40	T0/LZ/90	OTEEOSLT	S	IZ BI	OOT P	BISSA#
TO/OT/LO	T0/90/L0	TO/SO/LO	T0/LZ/90	OTPEOSOT	8	SV	OOT P	BISSK¢
T0/97/L0	T0/0Z/L0	10/50/40	10/42/90	OTEROSLT	S	ВТ	T00	BTS2X4
10/01/40	TO/90/LO	T0/S0/L0	T0/LZ/90	OTFEOSOT	S		TOO	BTS2X4
SIEYJANA	EXT/PREP	DATE REC	COFFECIA	PREP #	XTM	+	BEM \$	CPIEML ID



Lionville Laboratory, Inc.
THUMPARORD BOI-058 H1409

toppost

TO/SZ/LO	T0/0Z/40	A\N	Y/N	OTFEOSAT	s	-	<b>6</b> €	Tew		BLK
01/52/0T	T0/0Z/L0	Y/N	A/N	OTFEOSAT	S			MBI		BTK
TO/OT/LO	TO/90/40	A/N	A/N	OTFEOSOT	S		SE	WBJ		BPK
T0/0T/L0	10/90/40	A\N	$A \setminus M$	OTTEOBOT	S			TEM		BUK
•										:DØ BYT
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TO/OT/LO	T0/90/40	TO/90/40	T0/LZ/90	OTPEOSOT	5		MSD	TOO		BTS2XS
T0/97/L0	01/20/0T	TO/SO/40	T0/LZ/90	OTEROSAT	8	tч	SM	TOO		BIS2XS
TO/0T/LO	TO/90/40	TO/50/40	T0/LZ/90	OTFEOSOT	S		SW	TOO		BTS2XS
T0/9Z/L0	T0/0Z/L0	T0/S0/L0	TO/LZ/90	OTPROBLT	S	ВТ		TOO		BIS2XS
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SISYLANA	EXT/PREP	DATE REC	COPPECIN	# वश्चमव	XTM		#	Maa	ID	CLIENT



Lionville Laboratory, Inc.

THUMANPORD BO1-058 H1409

Figurating renotatory comple procedures webo	11(ODIY SUK#:
Initiator: 2. Kou From Batch: 01071.228, 231  Date: 7-14-01 Samples: A11  Client: TWW Hanford Method: SW846/MCAWW/CLPI P	Parameter: OPEO  Matrix: rep Batch:
Transcription Error Wrong Test Code  b. General Discrepancy Missing Sample/Extract Container Broken Wrong	Sample Pulled Label ID's Illegible vation Wrong Received Past Hold
3. Discussion and Proposed Action Other Description: Re-logEntire Batch/Following Samples:Re-leach VRe-extractRe-digestRevise EDDChange Test Code toPlage On/Take Off Hold (circle)	
4. Project Manager Instructionssignature/date:  Concur with Proposed Action Disagree with Proposed Action; See Instruction Include in Case Narrative Client Contacted: Date/Person Add Cancel	
5. Final Actionsignsture/date: Dunch for 1/2/v Other Exp  Verified re-[log][leach][extract][digest][analysis] (circle)  Included in Case Narrative  Hard Copy COC Revised  Electronic COC Revised  EDD Corrections Completed  When Final Action has been recorded, forward original to QA Specialist	OILE 0871 gles entraded plant habitance ce tradece
Route Distribution of Completed SDR Route Distri  X Initiator M X Lab General Manager M Taylor In X Project Mgr: Stone/Johnson-Haslett X Technical Mgr: Wesson/Daniels X QA (file): Alberts Data Management: Feldman	bution of <u>Completed</u> SDR etals: Beegle organic: Perrone C/LC: Kiger S: Rychiak/Layman og-in: Keppel dmin: Soos ther:

H

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Project Designation 200-TW-1 & 2 - Soil	l Sampling		Some	Ming Location 26/200 W					SAF! B01-0	Na		Air Qu	ality 🗌	45	Days C
Ice Chest No. EP.C.	99-06	5/SMLU	42 Field	Logbook No. -1518		COA B20TW	/1A44C			od <b>of Ship</b> EX	ment				
Shipped To			Offici	le Property No. A	Ø104	28			Bell o	42	357	<b>'534</b>	1.55	24/5	<b>83</b> 5
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000				Volume	SOCient	1000ml	N.	300m	al	500mL	1000	-	Callectes	Facility on root availab	le to relenc
00 <b>020</b>		Sample anal	YSIS		See item (1) in Special Instructions	See item (2) Special Instruction	(तप्र)	VA. See jien Speci Jastroci	إنسا	e ikest (4) in Special rastyselfans.	Sar Car	íJ	samples (		100 200
Sample No.		Matrix *	Sample Date	Sample Time											
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Reinhuished By/Ressyand F	77>	Date/Time (280)	PEGE	Thoras	2.01	(A (S) (S) (S)	id-on) (Binenti IC Anians - 30 12/NO3 - 353.1; Semi-VOA	i, Lead); 84 10.0 (Chlori Total Cyani 1270A (Add	iarcary - 7 de, Fluori ide - 9010 I-On) {Tri	7470 - (CV); de, Nitrate, 1 ); TOC - 906 ibuty/ phospi	Chroméu Nitrite, Ph O; pH (So bate); 72	m Hax - 7190 sospinte, Buli il) - 9045 H-Diessi Ras	6 Me); Ammonia - um - WTPH-D	350.3;	SO-dellé SI-Cleáge W = Water O-Oli
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Rolingsished By/Romoved F	ivan	Deln/Time	Received By/Mon	ed in De	te/Time									~6.23·01	
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Collector Thomas G./Watson D./MAN	93G, A.	Com	peny Contact dd, M.E.	Telepho					Pro	ect Coardi NT, SI	nator	Price	Code	8N	Data Tu	Chargens (
Project Designation 200-TW-1 & 2 - Soil Sample	ng		iling Location 26/200 W						SAF BOI	Ne. 058		Air (	Quality	0	45	Days -
Ice Chart Ne 5 M	153°24		Lagbook No. ,1518		CO ₄ B207	A TW1A4	4C		Met G	hed of Ship overment	ment I dhichlei	Yed EX				
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POSSIBLE SAMPLE HAZA															7	
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	<0.5 m	an assi	Type of Container	20	7	G	#G	1	1	#G	<b>40</b>	$\top$	₩G	16		
Special Handling and/or	Storage		No. of Container(s)	1	1	1	i	.4		1	ī		1	3.8	1	
000	·		Volume	120mL	60	mL	250ml		2/01	250mL	120=	i	250ml.	P mi	<del>                                     </del>	<del>                                     </del>
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Sample No.	Matrix *	Sample Date	Sample Time													
8125%2	SOIL	06-27-0	1115	X	<b>1</b>		X			X	X				TIETO	50629
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CHAIN OF POSSESSIO		Step/Pris				SPECI	al instr	UCTIO	enc						1.2	Matrix *
Relinquished By/Removed Prom	Data Timo 0 80	December By Sto	1.C 6.Z	1.8.0   1.8.0   1.2.0	800	(Add-or (2) fC	a) (Biarreth, l	Lend); M 8 {Chlori	lercury ide Flu	- 7470 - (CV oride, Nitroya	) na ina Nijitra	to, Nitrog	gen, iza Nistri	, ICP Metals - te, Phosphite, ill) - 9045		2-548 25-5-dinet 50-6-di 21-Shige W = Water
Barried Brandy M.	Cod Describe des	O Prince	<u>لا ح(</u>	nte/Tigae		(4) ICE Iron, Le	ed Magnesiu	OTR (C)	ient Lis massa, i	t) (Aluminum Molybdenum	Bismeth Nickel P	Cadmis otasium	en, Celcine Silver, Sc	VTPH-D n, Chromium, idium, Vanadi i <del>4 Despisa</del> .	um Zinc)	O=Oil A=Air DE=Drum Solide DE=Drum Liquid T=Tiques
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LABORATORY Received B	Y			Ti	ije										Date/Time	Ţ
FINAL SAMPLE Disposal No.	isthod						Dispo	od By							Deta/Time	
<u></u>																

## Appendix 5

**Data Validation Supporting Documentation** 

### WHC-SD-EN-SPP-002, Rev. 2

### GENERAL GC DATA VALIDATION CHECKLIST

Is technical verification documentation present?	VALIDATION LEVEL:	A	В	(°)	D	E
ANALYSES PERFORMED    B010	PROJECT: 2	100-Tw-	145	DATA PACKAGE	: #1409	
ANALYSES PERFORMED    19010	VALIDATOR:	411	LAB: LL	$\mathcal{I}_{}$	DATE: 21	)eco1
Data Package completeness and case narrative is a case narrative present?  Comments:  Comments:  Data Package times acceptable?   CASE:			SDG: H	1409		
SAMPLES/MATRIX: BI2574 BI2572 Soll  SAMPLES/MATRIX: BI2574 BI2572 Soll  BATA PACKAGE COMPLETENESS AND CASE NARRATIVE  Is technical verification documentation present?			ANALYSES	PERFORMED		
SAMPLES/MATRIX: BIZSY4 BIZSX2 Soll  BIZSY4 RF BIZSX2 RE  L. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE  Is technical verification documentation present?	D 8010	-27 <b>5</b> 015	□ 8020	□ <b>8021</b>	8140	8141
SAMPLES/MATRIX: BIZ5Y4 BIZ5X2 So./ BIZ5Y4RF BIZ5X2RE  1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE Is technical verification documentation present?	D 8150	D 8151	□ WTPH-HCID	□ WTPH-G	□ WTPH-D	0
I. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE  Is technical verification documentation present?	0	0	0	0	0	0
BIZSYARE  L. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE  Is technical verification documentation present?	SAMPLES/MATE	11X: 1312	544	B125X.	2	Soil
1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE  Is technical verification documentation present? Yes No N/  Comments:  2. HOLDING TIMES  Are sample holding times acceptable? Yes No N/			3.4.			
Is technical verification documentation present?			, .			
2. HOLDING TIMES  Are sample holding times acceptable? Yes No. No.						va. Na 61
Are sample holding times acceptable?	Is technical Is a case nar	verification rrative preser	documentation	n present? .	T T	
	Is technical Is a case nar	verification rrative preser	documentation	n present? .	T T	
	Is technical Is a case nar Comments:  2. HOLDING 1 Are sample ho	verification rative preser  TIMES olding times	documentation nt?	n present? .		Yes No N/
	Is technical Is a case nar Comments:  2. HOLDING 1 Are sample ho	verification rative preser  TIMES olding times	documentation nt?	n present? .		Yes No N/
	Is technical Is a case nar Comments:  2. HOLDING 1 Are sample ho	verification rative preser  TIMES olding times	documentation nt?	n present? .		Yes No N/

AN 000023

## WHC-SD-EN-SPP-002, Rev. 2

## GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION			
3.1 INITIAL CALIBRATION			
Was an initial calibration performed?	Yes	No (	N/A
Are %RSD values for calibration or response factors acceptable?	Yes	No (	N/A)
Comments:			_
			<del></del>
3.2 CONTINUING CALIBRATION			
Was a continuing calibration check performed?	Yes	No (	WA
Are %D values for calibration or response factors acceptable? .	Yes	No C	N/A
Comments:			
			-
4. BLANKS			
Were laboratory blanks analyzed?	<u></u>	No	N/A
Are laboratory blank results acceptable?	_	No	N/A
Were field/trip blanks analyzed?	Yes (	(No	N/A
Are field/trip blank results acceptable?	Yes	No	WA
5. ACCURACY			
Were surrogates analyzed?	, (Yes	No	N/A
Are surrogate recoveries acceptable?	1	No	N/A
Were MS/MSD samples analyzed?		No	N/A
Are MS/MSD recoveries acceptable?	•	Po	N/A
Were LCS samples analyzed?	. Yes	No	(1/4)
Are LCS recoveries acceptable?	. Yes	No	(N/A

## WHC-SD-EN-SPP-002, Rev. 2

## GENERAL GC DATA VALIDATION CHECKLIST

Comments: O90 surr S44 - OR	
1090 SUR 5X2 - 18J	
Ms 5x2- Orec I	
· 44 - 0k	
6. PRECISION	
Are MS/MSD sample RPD values acceptable? Yes	No N/A
Are field duplicate RPD values acceptable? Yes	No N/A
Are field split RPD values acceptable? Yes	No WA
Comments: XZ- already Td	
7. COMPOUND IDENTIFICATION AND QUANTITATION	
Is compound identification acceptable? Yes	No ( N/A
Is compound quantitation acceptable? Yes	No NA
Comments:	
8. REPORTED RESULTS AND DETECTION LIMITS	
Are results reported for all requested analyses? (Yes)	No NA
Are all results supported in the raw data? Yes	No (N/A
Do results meet the CRQLs? Yes  Comments: all undelece men	N/A
	<u> </u>

Date: 10 December 2001

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 200-TW-1&2 - Soil Sampling

Subject: Semivolatile - Data Package No. H1409-LLI (SDG No. H1409)

### INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	С	Semivolatiles by 8270C
B125Y4	6/27/01	Soil	С	Semivolatiles by 8270C

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

### **DATA QUALITY OBJECTIVES**

### Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J".

All other holding times were met.

#### Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

#### Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

### Accuracy

### Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control

limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

### Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the target required required quantitation limit (TRQL) are qualified as estimates and flagged "J". Sample results less than the TRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the TRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

#### Precision

### Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J".

### Field Duplicate Samples

No field duplicates were submitted for analysis.

### Analytical Detection Levels

Reported analytical detection levels are compared against the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan TRQLs to ensure that laboratory detection levels meet the required criteria. All analytes met their TRQL.

### Completeness

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

#### MINOR DEFICIENCIES

Due to a cooler temperature of 17°C upon arrival at the laboratory, all semivolatile results in sample B125Y4 were qualified as estimates and flagged "J". Due to RPDs outside QC limits, all semivolatile analytes in sample B125X2 were qualified as estimates and flagged "J". Due to a matrix spike duplicate recovery of 37%, all 1,2,4-trichlorobenzene associated analytes (1,2,4-trichlorobenzene and hexachlorobenzene) in sample B125X2 were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

### REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, February 2001.

## Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

## **DATA QUALIFICATION SUMMARY**

SDG: H1409	REVIEWER:	DATE: 12/10/01	PAGE_1_0F_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	B125Y4	Sample preservation
1,2,4-Trichlorobenzene Hexachlorobenzene	J	B125X2	MSD recovery
All	J	B125X2	RPD

## Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD				1											
Laboratory: Lionville Laboratory	lnc.														
Case:   SDG: H1409															
		B125X2		B125Y4						<u> </u>		<u> </u>			
Remarks								<u> </u>		<u> </u>	·- <u>-</u> -			<del></del>	
Sample Date		6/27/01 6/27/01													
Extraction Date		7/6/01			7/6/01										
Analysis Date		7/12/01		7/12/01				<b>↓</b>		<u> </u>	<del></del> _	<b>_</b>		<del> </del>	<del></del>
Semivolatile (8270C)	CROL	Result	Q	Result	Q_	Result	<u> a</u>	Result	Q.	Result	Q	Result	Q	Result	<u> a</u>
Phenol		340		350				<u> </u>	<del> </del>	<u> </u>		ļ <u>.</u>	<u> </u>	<u> </u>	
bis(2-Chloroethyl)ether		340		350				<u> </u>	┵	<b></b>	┷	<del> </del>	<del> </del>		
2-Chlorophenol		340	UJ	350				<u></u>	<b>_</b>		╄-	ļ	┿	<u> </u>	
1,3-Dichlorobenzene		340		350				<u> </u>	┦	<b></b>	┷		1_	<u> </u>	┿
1,4-Dichlorobenzene		340		350	_				┵		—	<del> </del>	-	<del> </del>	┼
1,2-Dichlorobenzene		340		350				<del> </del>	4	<del></del>	-	<del> </del>	<del> </del>	<del></del>	$+\!-$
2-Methylphenol		340		350			Ļ	ļ		<del> </del>			4	<del></del>	-
bis(2-Chloroisopropyl)ether		340		350					<del> </del>	<u> </u>	╄~	<u> </u>		<del> </del>	
4-Methylphenol	•	340		350					<del> </del>	<u> </u>	<del></del> _	<del> </del> _	-	<del>                                     </del>	—
N-Nitroso-di-n-propylamine		340	_	350				<u> </u>			-	<u> </u>	┩—	<del> </del>	—
Hexachloroethane		340	1	350							—	<del> </del>	<del> </del>	<del> </del>	—
Nitrobenzene		340		350				<u> </u>	4		┷		↓	<del> </del>	
Isophorone		340		350					<del> </del>		<del> -</del> -	ļ	—		┼
2-Nitrophenol		340		350				<u> </u>	4—	<u> </u>	┷	ļ	↓_	<del> </del>	
2,4-Dimethylphenol		340		350				<u> </u>	<del></del>		—		—	<del> </del>	
bis(2-Chloroethoxy)methane		340		350				<u> </u>	4_		╄-			<del> </del>	┿
2,4-Dichlorophenol		340		350				<u> </u>	<del> </del>		┿-	<b></b>	<b>ļ</b> _	<del> </del>	→—
1,2,4-Trichlorobenzene		340		350		<u> </u>		ļ. <u></u>		ļ			┿	<del></del>	+-
Naphthalene		340		350				<u>.                                    </u>	<del></del>	<u> </u>			—	<del> </del>	+-
4-Chloroaniline		340		350		<u> </u>		<u> </u>	-	<del> </del>		<del></del> _	-	<del></del>	<del> </del>
Hexachiorobutadiene		340		350	_					<u> </u>	┷	ļ	╂	<del></del>	
4-Chloro-3-methylphenol		340		350				<b>↓</b>		ļ		<u> </u>	┿	<del> </del>	
2-Methylnaphthalene		340		350		<u> </u>			<del> </del>	<u> </u>	ļ	<del> </del>			
Hexachlorocyclopentadiene		340		350		<u> </u>		<b></b>		<del></del>	┷	<del> </del>	-	<del> </del>	+-
2,4,6-Trichlorophenol		340		350				<del> </del>		. <u> </u>			┼	<del> </del>	<del></del> -
2,4,5-Trichiorophenol		860		860					<b>↓</b>	<u> </u>	<del></del>		<u> </u>	<del></del>	<del></del>
2-Chloronaphthalene		340		350		<u> </u>	4-	<b> </b>	-		┿	<del> </del>	-	<del></del>	+
2-Nitroaniline		860		860	_			<u> </u>	Д	ļ	+-	<del> </del>	+-	<del> </del>	—
Dimethylphthalate			UJ	350				<u> </u>	<del> </del>	<b>.</b>	<del> </del>		<del>  _</del>	<del></del>	┿
Acenaphthylene		340		350				<u> </u>			-	<del> </del>	+	<del>                                      </del>	
2,6-Dinitrotoluene		340		350		<u> </u>		<u> </u>	<b>_</b>			<del> </del> _		<del> </del> -	
3-Nitroaniline		860	UJ	860				<u> </u>		<u> </u>	ᆚ_		$\bot$	<del> </del>	—
Acenaphthene		340	UJ	350	UJ			1		<u></u>		<u> </u>			

Project: BECHTEL-HANFORD															
Laboratory: Lionville Laboratory Inc.				1											
Case:	SDG: H1409		<u> </u>				<del></del>				<del></del>				
Sample Number		B125X2		B125Y4				<u> </u>				<u> </u>		<u> </u>	
Remarks		[		L		<u> </u>		<u> </u>				<u> </u>		<del></del>	
Sample Date		6/27/01		6/27/01		<u> </u>		<u> </u>		ļ				<del></del>	
Extraction Date		7/6/01		7/8/01				<u> </u>		<del> </del>		<u> </u>		<del> </del>	
Analysis Date		7/12/01		7/12/01									<del></del>	<u> </u>	
Semivolatile (8270C)	CRQL	Result	<u>a</u>	Result	Q.	Result	<u>a</u>	Result	<u> a</u>	Result	<u>  0</u> _	Result	lo	Result	Q
2,4-Dinitrophenol		860		860				ļ	↓	<b></b>	—		↓	<del></del>	
4-Nitrophenol		860		860		<del> </del>			<del> </del>	<u> </u>	<u> </u>		<del> </del>	<del></del>	┿┵
Dibenzofuran		340		350				<u> </u>	<del>                                     </del>	<b> </b>	╁		—	<del></del>	4
2,4-Dinitrotoluene		340		350			4-	<b></b>	4	<del> </del>	<del> </del>	<del>                                     </del>	╁	<del> </del>	
Diethylphthalate		340	_	350		<b></b>			┵—	<u> </u>	┿	ļ	┼-	<del> </del>	
4-Chlorophenyl-phenyl ether		340		350		<b></b>	—	ļ	<del> </del>		┦	<del></del>	<del> </del>	<del> </del>	
Fluorene		340		350				<u> </u>	↓	<del> </del>	↓_	<u> </u>	↓_	<del> </del>	4
4-Nitroaniline		860		860				ļ	<u> </u>		+	<u> </u>	<del> </del>	ļ	
4,6-Dinitro-2-methylphenol		860		860				<u> </u>	<b>-</b>	<u> </u>	<del> </del>		4	<u> </u>	4
N-Nitrosodiphenylamine		340		350	_	<u> </u>	┵	<u> </u>	┦	<u> </u>	╄-		<u> </u>	<del></del>	<b></b>
4-Bromophenyi-phenyi ether		340		350				<u> </u>	↓	<del> </del>	—		↓		4
Hexachiorobenzene		340		350			<del></del>		1	<b></b>	┦	<del> </del>	<del>  -</del>	<del> </del>	4
Pentachlorophenol		860		860			<del></del>	<u> </u>	-	<u> </u>			ļ	<u> </u>	<b></b> _
Phenanthrene		340		350				<u> </u>	<del>                                     </del>		<b> </b>	<b></b> _	╄	ļ	
Carbazole		340		350				ļ	4_	<del> </del>	┿	<u> </u>		<del> </del>	
Di-n-butylphthalate		340		350			<del></del>	<del> </del>	<del> </del>	<del> </del>	┿	ļ	<del>                                     </del>	<del> </del>	4
Fluoranthene		340		350		<u> </u>		<u> </u>	╁		<del> </del>		-	<del></del>	┵╌┦
Pyrene		340		350		<u> </u>		<u> </u>	4	<del> </del>	<del> </del>	<del> </del> -	↓_	<del> </del>	<del>-  </del>
Butylbenzylphthalate		340		350				<del> </del>		<b></b>	╄	<del> </del>	<del> </del>	<del> </del> -	_
3,3'-Dichlorobenzidine		340		350		<u> </u>			-		┿		┼	<del> </del>	
Benzo(a)anthracene		340		. 350		ļ		ļ. — —	-	<del> </del>	╂	<del> </del>		<del>↓                                     </del>	
Chrysene		340		350		<u> </u>		<b></b> -	-	<del> </del>	┼	<del></del>	╁	<del> </del>	
bis(2-Ethylhexyl)phthaiste		340		350		<u> </u>		<del> </del>	╅	<del> </del>	┿	<del> </del>	╁╾	<del></del>	4
Di-n-octylphthelate		340		350		<u> </u>	-	<b></b>	┥	<del> </del>	╂━	<u> </u>	┼	<del></del>	+
Benzo(b)fluoranthene		340		350	_	<del> </del>		<del> </del>	<del>  -</del> -	<del> </del>	╁	<del> </del>	╁	<del> </del> -	
Benzo(k)fluoranthene	<u> </u>	340		350			+	<b> </b> -	+-	<del> </del>	-	<del> </del>	1-	<del> </del>	+
Benzo(a)pyrene		340		350		<u> </u>		<del> </del>	<del></del>	<del> </del>	-	<del> </del>	┼-	<del> </del>	<del></del>
Indeno(1,2,3-od)pyrene	<u> </u>	340		350		<u> </u>		<del> </del>	<del>. </del>	<del> </del>	┾	<del> </del>	<del>  -</del>	<del> </del> -	┿┵
Dibenz(a,h)anthracene	<u> </u>	340		350			4-	<u> </u>	┼—	<del> </del>	┼	<del> </del>	┨—	<del> </del>	
Benzo(g,h,i)perylene		340		350		·		<b></b>	╂	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	
Tributyiphosphate	3300	340	Inn	350	กา		<del></del>	<u> </u>	<del> </del>	<b></b>	╁	<del> </del>	+-	<del> </del>	+
	<u> </u>	<u>L</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u>l</u>		<u>L</u> _		1		J	

### Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List

Report Date: 07/27/01 14:53

330 U

830

330 U

ប

830

350 U

870 U

Work Order: 11343606001 Page: la Client: TNUHAMFORD B01-058 H1409 RFW Batch Number: 0107L228 SBLKBP BS SBLKBP Cust ID: B125Y4 B125Y4 B125Y4 001 MS 001 MSD 01LE0800-MB1 01LE0800-MB1 001 Sample RFW#: SOIL SOIL SOIL SOIL SOIL Information Matrix: 1.00 1.00 1.00 D.F. 1.00 1.00 ug/Kg ug/Kg uq/Kg uq/Kq ug/Kg Units: ¥ 64 * 84 * 65 Ł 60 Nitrobenzene-d5 67 ŧ 86 Ł 68 69 Ł 67 ł 2-Fluorobiohenyl 69 Surrogate ł 93 113 105 ł 80 Ł 92 p-Terphenyl-d14 Recovery 93 ł 74 Ł 74 78 78 Phenol-d5 85 67 70 * 66 2-Fluorophenol 73 105 73 81 Ł 71 2.4.6-Tribromophenol 75 **fi=****** 69 71 Ł 330 87 U ¥ Phenol 350 330 U Ü 350 U 330 bis (2-Chloroethyl) ether____ U 350 350 * 330 U 83 350 U 64 ł 67 2-Chlorophenol 350 U 350 330 D 330 U 1.3-Dichlorobenzene_____ 350 U 72 350 U 51 ¥ 57 330 U 1,4-Dichlorobenzene 350 U 350 U 330 U 330 U Ħ 350 1,2-Dichlorobenzene 350 U 350 U 330 U 330 П 2-Methylphenol_____ U 350 330 U 330 U 2,2'-oxybis(1-Chloropropane) U 350 U 350 U 350 350 U 330 U 330 U 4-Methylphenol____ 350 U 350 U N-Nitroso-Di-n-propylamine 350 П 77 77 330 U 109 330 D 330 U 350 ΪŢ 350 Œ Hexachloroethane _____ 350 U Nitrobenzene 350 U 350 U 350 u 330 U 330 U 350 11 350 U 350 U 330 U 330 U Isophorone U 2-Nitrophenol_____ 350 U 350 U 350 U 330 U 330 IJ 350 17 350 U 330 U 330 IJ 350 2,4-Dimethylphenol Ü bis(2-Chloroethoxy)methane 350 Ħ 350 U 350 U 330 U 330 U 2,4-Dichlorophenol____ IJ 350 U 350 U 330 U 330 350 1,2,4-Trichlorobenzene 350 11 58 ŧ 62 * 330 U 80 * 350 IJ 350 IJ 350 U 330 U 330 U Naphthalene 330 U 350 U 350 U 330 U 350 Ħ 4-Chloroaniline 350 U 350 U 330 U 330 U 350 U Hexachlorobutadiene * 350 Ħ 70 Ł 71 ŧ 330 U 96 4-Chloro-3-methylphenol Tī 350 tt 350 D 330 U 330 U 350 2-Methylnaphthalene___ 350 U 330 U 330 U 350 U 350 U Hexachlorocyclopentadiene

350 U

870 U

v ()/

U

350

860

2,4,5-Trichlorophenol
*= Outside of RPA CLP QC limits.

2,4.6-Trichlorophenol

Cust ID:	B125Y4			B125Y4		B125Y4		SBLXBP		SBLKBP BS		
RFW#:	001			001 <b>M</b> S		001 MSD		01LE0800-MB	1	01LE0800-M	31	
2-Chloronaphthalene	350	U	7	350	U	350	Ū	330	U	330		
2-Nitroaniline	860	U	í	870	U	870	U		U		U	
Dimethylphthalate	350	U	- [	350	U	350	U		Ü		U	
Acenaphthylene		U	1	350	U	350	U	330	U		U	
2,6-Dinitrotoluene	350	U	1	350	U	350	U		Ū	330	IJ	
-Nitroaniline		U	1	870	U	870	U		U	830	U	
		Ū	1	66	*	69	*		Ū	86	¥	
Acenaphthene	860	U	1	870	U	870	U	·	U	830	U	
-Nitrophenol	860	U		52	*	53	*		U	72	*	
ibenzofuran	350	U	[	350	U	350	U	330		330	U	
Dibenzofuran 2,4-Dinitrotoluene Diethylphthalate	350	Ū	}	65	*	69	*	330		89	*	
Diethylphthalate	350	U	}	350	U	350	U	330 1		330	U	
-Chlorophenyl-phenylether	350	U	}	350	U	350	ប	330 1		330	Ü	
-Chlorophenyl-phenylether	350	Ū	1	350	U	350	Ũ	330		=	D,	
-Nitroaniline	860	U		870	U	870	U	830	Ū		U	
,6-Dinitro-2-methylphenol	860	U	1	870	U	· 870	U	830	Ü	830	U	
-Nitrosodiphenylamine (1)	350	U	ļ	350	U	350	Ũ	330 1	Ū	330	U	
-Bromophenyl-phenylether		U	1	350	U	350	Ū	330	U	330	U	
lexachlorobenzene	350	U	i	350	U	350	Ũ	330	Ü	330	U	
Pentachlorophenol	860	U	1	73	*	76	ŧ	830	Û	100	8	
Phenanthrene	350	U		350	U	350	U	330	Ū.	330 `	Ū	
Anthracene		U		350	U	350	U	330	Ū	330	Ū	•
Carbazole		U	1	350	U	350	Ũ	330	U	330	Ū	
Di-n-Butylphthalate	350	U	1	350	U	350	U	330	Ū	330	U	
luoranthene		U		350	U	350	U	330	U	330	U	
		ប	1	76	*	86	*	330	IJ	105	ł	
PyreneButylbenzylphthalateButylbenzylphthalateButylbenzylphthalate	350	U	1	350	ប	350	U	330	Ü	330	U	
3,3'-Dichlorobenzidine	350	U	1	350	U	350	U	330	Ū	330	U	
Benzo (a) anthracene	350	U	1	350	U	350	U	330	Ū	330	U	
Chrysene	350	U	1	350	U	350	U	330	Ū	330	U	
ois(2-Ethylhexyl)phthalate	350	U	1	350	U	93	J	330	U	330	U	
oi-n-Octyl phthalate	350	U	1	350	ប	350	ប	330	U	330	U	
Benzo(b) fluoranthene	350	U	1	350	U	350	Ū	330	U	330	U	
Senzo(k) fluoranthene	350	U	-	350	U	350	Ū	330	Ū	330	Ū	
Benzo (a) pyrene	350	U	1	350	U	350	U	330	U	330	U	
Senzo(a) pyrene	350		1	350		350		330			U	12/401
Dibenzo(a,h)anthracene	350	Ū	1	350	ប	350	U	330			U	(44/1
Senzo(g,h,i)perylene	350	IJ	1.	350	U	350	U	330		330	U	. 9
Pributylphosphate (1) - Cannot be separated from Dip			N/	350		350	<b>17</b>	330		330		

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List

Report Date: 07/27/01 14:58

Work Order: 11343606001 Page: _ la Client: THUHAMFORD B01-058 H1409 RFW Batch Number: 0107L231 B125X2 SBLKBP SBLKBP BS B125X2 Cust ID: B125X2 001 MS 001 KSD 01LE0800-MB1 01LE0800-MB1 001 Samole RPW#: SOIL SOIL SOIL SOIL SOIL Information Matrix: 1.00 1.00 1.00 1.00 D.F.: 1.00 ug/Kg ug/Kg ug/Kg uq/Kq Units: ug/Kg ¥ * 64 ¥ 84 63 64 38 Nitrobenzene-d5 ł ł 69 ¥ 86 * 39 * 2-Fluorobiphenyl 69 66 Surrogate 113 ¥ 87 ¥ ¥ 93 * p-Terphenvl-d14 93 Recovery 43 Ł 78 ł 93 **t** . . 72 Phenol-d5 77 38 ¥ 70 k 85 65 69 2-Fluorophenol 74 44 ł 81 105 2,4,6-Tribromophenol 88  $_{0}$   $\bot$ 71 * 41 * 330 U 340 360' U 330 U 330 U U 350 T) bis(2-Chloroethyl)ether 340 330 U 83 Ł 2-Chlorophenol ł 38 ¥ 340 U 66 330 П. 350 Œ 360 IJ 330 U 1.3-Dichlorobenzene 340 U 72 ł 340 U 58 1 32 1 330 U 1,4-Dichlorobenzene TT 350 U 360 U 330 U 330 U 340 1,2-Dichlorobenzene 350 U 360 D 330 U 330 U 2-Methylphenol____ 340 U 330 U 330 2,2'-oxybis(1-Chloropropane) 340 U 350 U 360 U U 4-Methylphenol 330 340 Ħ 350 Ð 360 U 330 U N-Nitroso-Di-n-propylamine 86 49 * 330 U 109 2 340 U 330 Ħ 340 350 IJ 360 U 330 U Hexachloroethane_____ (7 350 D 360 U 330 U 330 Ù 340 Nitrobenzene 340 350 IJ 360 U 330 U 330 U U Isophorone 340 IJ 350 U 360 U 330 U 330 U 2-Nitrophenol 350 U 360 U 330 U 330 2.4-Dimethylphenol 340 IJ U bis (2-Chloroethoxy) methane 350 U 360 U 330 U 340 U 330 ប 2.4-Dichlorophenol 340 U 350 U 360 U 330 U 330 U 340 IJ 65 ł 37 * % 330 U 80 * 1,2,4-Trichlorobenzene 340 IJ 350 U 360 U 330 U 330 U Naphthalene 340 U 350 U 360 U 330 U 330 U 4-Chloroaniline Hexachlorobutadiene 340 U 350 U 360 U 330 0 330 IJ 4-Chloro-3-methylphenol____ 340 U 73 ¥ 43 ¥ 330 TJ 96 ŧ 2-Methylnaphthalene 340 U 350 U 360 U 330 U 330 U 340 U 350 U 360 U Hexachlorocyclopentadiene ____ 330 U 330 U 340 ע / 2,4,6-Trichlorophenol_____ 350 U 360 U 330 Ū 330 U 2,4,5-Trichlorophenol 860 U 880 U 890 U 830 U 830 U *= Outside of EPA CLP QC limits.

Page: 1b

Work Order: 11343606001

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(1) - Cannot be separated from Diphenylamine. *= Outside of BPA CLP QC limits.

Client: TNUHAMFORD B01-058 H1409

B125X2

B125X2

RFW Batch Number: 0107L231

Dibenzo (a, h) anthracene

Benzo(g,h,i)perylene_____

Tributylphosphate____

Cust ID:

# Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Client: TNU-HANFORD B01-058

RFW #: 0107L228

SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00

Date Received: 07-05-2001

#### **SEMIVOLATILE**

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-12,16-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- The sample was extracted and analyzed within required holding times. 2.
- 3. A non-target compound was detected in the sample.
- 4. All surrogate recoveries were within EPA OC limits.
- 5. All matrix spike recoveries were within EPA OC limits.
- 6. All blank spike recoveries were within EPA QC limits.
- 7. Internal standard area and retention time criteria were met.
- "I certify that this sample data package is in compliance with SOW requirements, both 8. technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Lionville Laboratory Incorporated

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Client: TNU-HANFORD B01-058

LVL#: 0107L231

SDG/SAF #: H1409/B01-058

W.O. #: 11343-606-001-9999-00

Date Received: 07-05-2001

### **SEMIVOLATILE**

One (1) soil sample was collected on 06-27-2001.

The sample and its associated QC samples were extracted on 07-06-2001 and analyzed according to criteria set forth in Lionville Laboratory OPs based on SW 846 Method 8270C for TCL and Tributylphosphate Semivolatile target compounds on 07-16-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. The sample was extracted and analyzed within required holding times.
- 3. A non-target compound was detected in the sample.
- 4. All surrogate recoveries were within EPA QC limits.
- 5. One (1) of twenty-two (22) matrix spike recoveries was outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 6. All blank spike recoveries were within EPA QC limits.
- 7. Internal standard area and retention time criteria were met.
- 8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

J. Michael Taylor

Date

President

Lionville Laboratory Incorporated

som/gorup/data/bma/tnu-hanford-0107-231.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 2 pages.



## Lionville Laboratory, Inc. BNA ANALYTICAL DATA PACKAGE FOR TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L228

CLIENT ID	LVL	#	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
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B125Y4	001		S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001	MS	S	01LE0800	06/27/01	07/06/01	07/12/01
B125Y4	001	MSD	s	01LE0800	06/27/01	07/06/01	07/12/01
LAB QC:							
SBLKBP	MB1		s	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1	BS	s	01LE0800	N/A	07/06/01	07/16/01



# Lionville Laboratory, Inc. BNA ANALYTICAL DATA PACKAGE FOR TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2	001	s	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MS	S	01LE0800	06/27/01	07/06/01	07/16/01
B125X2	001 MSD	S	01LE0800	06/27/01	07/06/01	07/16/01
LAB QC:		*				
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SBLKBP	MB1	s	01LE0800	N/A	07/06/01	07/16/01
SBLKBP	MB1 BS	s	01LE0800	N/A	07/06/01	07/16/01

Initiator: John W. Smith Batch:	-01071231	Parameter:	
Date: 7/17/01 Samples: Client: Two Hunted Bayoss Method:	SW848MCAWWICLPI	Matrix: Prep Batch:	SCIL OLLEUSCO
H1409			
1. Reason for SDR a. COC Discrepancy Tech Profile Error Transcription Error	_ Client Request _ Wrong Test Code	Sampler Error on C Other	:-o-c
b. General Discrepancy  Missing Sample/Extract Container B  Hold Time Exceeded Insufficient	Sample Pr		Label ID's Illegible Received Past Hold
improper Bottle Type Not Amenat  Note : Verified by [Log-in] or [Prep Group] (circle)signatu	•		
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1,2,4-Trichlorobeneous fails	law in -001 T.	"All other spokes	s and surrogates
Meet criteria.			
, .			
2. Known or Probable Causes(s)		<u> </u>	
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Discussion and Proposed Action     Re-log	Other Description:	ط	
Entire Batch	Report à l	dilate	
Following Samples:	<i>^</i>	·	
Re-extract /			
Re-digest Revise EDD	1		
Change Test Code to Place On/Take Off Hold (circle)	$I \sim 0$		
4. Project Manager Instructionssignature/datase	BATHUT ENK	AM	<del></del> -
V Concur with Proposed Action	$\mathcal{A}$		
Disagree with Proposed Action; See Instruction Include in Case Narrative	ction		
Client Contacted:			
Date/Person			
e_ Cancel	1 :		
	Othe	r Explanation:	
Verified re-[log][leach][extract][digest][analy	SISJ (CITCIE)		
Hard Copy COC Revised	•		
Electronic COC Revised EDD Corrections Completed			
When Final Action has been recorded, forwar	rd original to QA Spec	ialist for distribution ar	nd filing.
Route Distribution of Completed SDR	Route	Distribution of Completed	SDR
X Initiator X Lab General Manager: M. Taylor	·	Metals: Beegle Inorganic: Perrone	
X Project Mgr: Stone/Johnson/Haslett	<del>-</del> -	GC/LC: Kiger	_
X Technical Mgr. Wesson/Danlels X QA (file): Alberts	. تص	MS: Rychlak/Layman Log-in: Keppel	)
Data Management: Feldman	<del>-</del> -	Admin: Soos	
Sample Prep: Beegle/Kiger	*	Other:	
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Earlies For ET ( 25 P) CAR POSTES SAMPLE HAZARDS/REAMARKS  Confecctive Systy Representative Confect Co	Project Designation 200-TW-I & 2 - Soil Se	impling										A	ir Quality	<b>,</b> D	45	Days	
POSSIBLE SAMPLE HAZERSEMARS Refrective  55 k flyce ACTIVITY  C C 5 refer Octob  Type of Continuer  1 Type of Conti	Ice Chest No. 5'M		_ '					MC					EX				
Preservation Special Handling and/or Storage  Type of Containing Special Handling and/or Storage Type of Containing Special Handling and/or Storage Type of Containing Type of C	Shipped To PT 6-2	BORECRA		Office	Property No. RS	RI	041	30		Be	of Lading/	A BEN No.	l No.				
Samples No. of Contribution (1)   1   1   1   1   1   1   1   1   1	POSSIBLE SAMPLE H					]					]				7		
Samples No. of Contribution (1)  Volume  120nd.  Samples No. of Contribution (1)  Volume  120nd.  Samples No. of Contribution (1)  S	Radioactive	55K dpm	ACTIVITY BOTTLES		Preservation	Cadl 4C	Ceol 4C	Cool 4C	Cod		Coel 4C			HOME			
No. of Container(s)  Volume  170ml  Cont.  C	   Special Handling an		In Octo		Type of Container		<u> </u>	[		1							
Sample No. Main's Sample Data Sample Time  Sample No. Main's Sample Data Sample Data Sample Time  Sample No. Main's Sample Data Sample Data Sample Time  Sample No. Main's Sample Data Sample Data Sample Data Sample Data Sample No. Time  Sample No. Main's Sample Data Sample Data Sample Data Sample No. Time  Sample No. Main's Sample Data Sample Data Sample Data Sample No. Time  Sample No. Main's Sample Data Sample Data Sample No. Time  Sample Data Sample Data Sample No. Time  Sample Data Sample No. Data Sample No. Data Sample No. Time  Sample Data Sample No. Data	-1			]	No. of Container(s)	1		<u> </u>	1		1	1	<u> </u>	1/15	<u> </u>		
Sample No. Men're Sample Date Screph Time  Sample No. Men're Sample Date Screph Time  Sample Date Screph Time  Sample Date Screph Time  Sample State of the sample screen in Rock Comments  Sample stored in Rock Comments  (All Com						120mL	60mL	250mL	1	2/01	250mL	120mi.	250ml.	18hi			
Sample No. Matrix * Sample Date Sample Tree  B125X2 SOR. 06-77-01 1115  Samples stored in Relative at the  3728 Shipping Facility on 1850 JED J.  Collector and available to reliaquish samples on 772-101 for shipment.  CELAIN OF POSSESSION  Sign Frist Name  Rejorated Prom Date Time 0 200 Resolved By Stored in Date Time 0 100-11 for Shipment.  CELAIN OF POSSESSION  Sign Frist Name  SPECIAL INSTRUCTIONS  (1) 102 Matrix - 1010 (Simunt, Long, Michael, Silven); ICP Match - 5010A (Add on) (Simunt, Long, Michael, Silven); ICP Match - 5010A (Add on) (Simunt, Long, Michael, Nitrogen in Michael, Microgen in Michael, Micro		SAMPLE ANALYSIS						Special	100	1260A (L)	Special	Special	Special	Activity Sten		)24	
Samples sterved in Ref. 2 at the 3728 Shipping Facility on 6 125 DL Collector not available to relinquish samples on 1/2 1/2 for shipment.  CHAIN OF ROSSESSION  SignFried Names  Date Time O gap Received by Street in Date Time Date Time Date Time Date Time Received By Street in Date Time Date Time Received By Street in Date Time Date Time Date Time Received By Street in Date Time Date Time Received By Street in Date Time Received By Street in Date Time Date Time Date Time Received By Street in Date Time Date Time Received By Street in Date Time Date Time Date Time Date Time Received By Street in Date Time Date						30 c 11 Veres	27 27 2 11 22 - 12				gggggan samenan ing	No. of the second			8 3 2 2 2 2 2 2 2	30.	
Samples stered in Ref.# C at the 3728 Shipping Facility on L [RSD]. Collector act available to reliaquish samples on 1/2 [P] for shipment.  Reliaming Dylamored From Date/Time & Collector and active to reliaquish samples on 1/2 [P] for shipment.  Reliaming Dylamored From Date/Time & Collector and Dylamored From Date/Time  Respirately Dylamored From Date/Time  Date/Tim									š	أمسمت							
CHAIN OF POSSESSION  Sign/Frint Names  CHAIN OF POSSESSION  Sign/Frint Names  CHAIN OF POSSESSION  Sign/Frint Names  Determined Dynamoved From  Determined D	51204	SUR	לע-20	<u>-0</u> 1	<u> </u>	_ <b>_</b> _	<del>                                     </del>		<del> </del>			_X_	<del></del>	<del> </del>	171610	B=638	
CHAIN OF POSSESSION  Sign/Print Names  Religionished By States of Print  Date Time O Sag  Received By States In Date Time  Date Time  Received By States In Date Time  Date							,				372 - Col	3 Shippis lector not	ig Facility ( t available (	n <u>6 /28/</u> n relinquis	( <u>D)</u> .		
Reinprinted By Reserved From Date Time Sept Control By Received By Stored in Date Time Sept Control By Received By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored in Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Stored By Stored In Date Time Sept Control By Sept Contro								ial instr	UCTE	ONS		-		•		Metrix*	
	Relinquished By Removed Fro Relinquished By Removed Fro Relinquished By Removed Fro Relinquished By Removed Fro LABORATORY Research	Delo Time   O Spring	By Store	in Thereof	8.01 10/Time 0 1.2.D 10/Time 10/S 10/Time	(1) II (Additional (2) II (2) II (3) 8 (4) II Iron, I (5) 0 (5) 0 (6) II (9) 7	on) (Bimenth, 1 C Anions - 300.6 onis - 350.1; NC onis - 350.1; NC onis - 400.1 C Magnesia onis - 406.0 Americana - 406.0 Americana - 406.0	Lend); i 3 (Chico 02/NO3 70A (Ad OTR (C m, Man 100pp (C m, (Sudi 1: Cude	dercey ride, Pl - 353.1 M-On) Heart Li granes, heart 27 may 27 may 27	y - 7476 - (CV) turide, Nitrogu I; Tatal Cyunid (Tributyl phou ist) {Akassimum , Molybdursum, 122 Cahalt 60, I; KERSIN-2227 turinium 227;	n in Nitrata, 1 n - 9010; TOX shate); 1Pfi- , Bismath, Co Nichal, Potas Surregium-M	Nitrogen in Nitri C - 9060; pH (Sc Dissel Renge - 1 schmium, Calcius stium, Silver, Sc 69, Therepium - 14 Stratum, Seatopi	its, Phosphate, 2015 Ph. 9945 Ph. Don, Chronoism, 104 Ph. Don, Chronoism, 104 Ph. Physica L. Thering 198 Ph. Test 199, Tax	Sulfac); Copper, ma, Zinc) SSI- Latina	80-Ordinas 20-Ordin 51-Ordin 10-Ordin 0-Ordin 20-Orom Solda Dir-Otom Lópida Dir-Otom Lópida 10-Ordina 10-Ordina Ur-Otom		
	FINAL SAMPLE Disp	atal Methat						Dispos	ed By		<del> </del>		<u></u>	D	Outo/Times		

## Appendix 5

**Data Validation Supporting Documentation** 

# WHC-SD-EN-SPP-002, Rev. 2

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

LEVEL:	A	В	(°)	D	Ε
PROJECT: 2	∞-TW-1+.	>	DATA PACKAGE		
VALIDATOR:	tL1	LAB: LL		DATE: 20	(0)
CASE:			SDG:	H1409	
		ANALYSES	PERFORMED		
CLP Volatiles	SW-846 8240 (cap column)	SW-846 8260 (packed column)	CLP Semivolatiles	SW-846 6270 (cap column)	SW-846 (pecked column)
				0	
SAMPLES/MATE	(IN US/23	YZ B			Soil
	(AGE COMPLETEN		NARRATIVE		
	rative preser		n present? .		Yes No N/A
Comments:	rative preser	it?			Ves No N/A
Comments: 2. HOLDING	rative preser	acceptable?			

## WHC-SD-EN-SPP-002, Rev. 2

## GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION	`
Is the GC/MS tuning/performance check acceptable? Yes No	/A\
<b>2.1</b>	/A \
	/A /
Comments:	
·	
4. BLANKS	
Were laboratory blanks analyzed? Yes No	I/A
	I/A
	IζA
	I/A)
Comments:	_
5. ACCURACY	
	N/A
	N/A
	N/A
	N/A
Comments: 124 pruliuro benjere 3770 - X3	

A-26000277

# WHC-SD-EN-SPP-002, Rev. 2

# GC/MS ORGANIC DATA VALIDATION CHECKLIST

. PRECISION	
re MS/MSD RPD values acceptable? Yes (No)	K
re field duplicate RPD values acceptable? Yes No 🔀	1/A)
omments: all X2 out	<u>(/A)</u> —
7. SYSTEM PERFORMANCE	_
Were internal standards analyzed? Yes No	N/A
Are internal standard areas acceptable? Yes No	N/A
Are internal standard retention times acceptable? Yes No \Comments:	N/A
8. COMPOUND IDENTIFICATION AND QUANTITATION  Is compound identification acceptable? Yes No  Is compound quantitation acceptable? Yes No  Comments:	N/A N/A
9. REPORTED RESULTS AND QUANTITATION LIMITS	
Are results reported for all requested analyses? Yes No	N/A
Are all results supported in the raw data? Yes No	N/A)
Do results meet the CRQLs?	NZA
Has the laboratory properly identified and coded all TIC? Yes No	R/A
Comments: TSP - ever	

Date:

10 December 2001

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

200-TW-1&2 - Soil Sampling

Subject: Radiochemistry - Data Package No. H1409-ES (SDG No. H1409)

## INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-ES prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	С	See note 1
B125Y4	6/27/01	Soil	С	See note 1

¹⁻ Tritium; carbon-14; nickel-63; total strontium; americium-241; technetium-99; isotopic uranium, plutonium and thorium; neptunium-237; gamma spectroscopy; total uranium.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Data Requested by Client

## **DATA QUALITY PARAMETERS**

## Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

#### Method Blanks

## Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable although the target required quantitation limits (TRQLs) were exceeded for 17 of the 29 analytes.

## Field Blank

No field blanks were submitted for analysis.

## Accuracy

Accuracy is evaluated from laboratory control sample (LCS) or samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%, tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

## Laboratory Duplicates

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using

unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the TRQL and the RPD is less than 35%, no qualification is required. If either activity (concentration) is less than five times the TRQL, the RPD control limit is less than or equal to two times the TRQL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

## Field Duplicate

No field duplicates were submitted for analysis.

#### Detection Levels

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 TRQLs to ensure that laboratory detection levels meet the required criteria. The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific TRQL.

## Completeness

Data package No. H1409-ES (SDG No. H1409) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### **MAJOR DEFICIENCIES**

None found.

### MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all carbon-14 and total uranium results were qualified as estimates and flagged "J". Due to an RPD of 45%, all plutonium-238 results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes were reported above their TRQL: Uranium-235(alpha), neptunium-237, radium-226, radium-228, europium-152, nickel-63, cobalt-60 and thorium-232(gea) in sample B125X2 and europium-154 in sample B125Y4. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, February 2001.

# Appendix 1 Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2
Summary of Data Qualification

## **DATA QUALIFICATION SUMMARY**

SDG: H1409	REVIEWER: TLI	DATE: 12/10/01	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Carbon-14 Total uranium	J	All	No matrix spike
Plutonium-238	J	All	RPD

## Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

B / BEAUTH				1													
Project: BECHTEL-HANFORD				ł													
Laboratory: Eberline Services				ļ													
	SDG: H			<u> </u>						,				,			
Sample Number		B125X2		B125Y4				<b></b>									
Remerics				<u> </u>				<u> </u>									
Sample Date		06/27/01		06/27/01			,				,						
Radiochemistry	CROL				d	Result	<u>a</u>	Result	a	Result	<u>a</u>	Result	<u>a</u>	Result		Result	a
Tritium	400	0.466		0.028	1												L
Carbon-14	50	-0.955	3	1.23	3		L						<u> </u>		L		
Niokei-63	30	-1,80	٥	0.487	٥			<u> </u>									
Total Strontium	1	49100		0.026	Ü			<u></u>			Ċ						
Americium-241	1	227		-0.005	U												Γ
Technetium-99	15	0.909	٥	-0.007	ے				<u> </u>								П
Thorium-228		4.09	ລ	0.447	ح												П
Thorium-230		0.582	U	0.284	U				Г						Г		
Thorism-232	1	1.74	U	0.365											Г		T
Total Uranium (ug/g)	1	61.1	J	1.72	J				ſ						Г		П
Uranium-233	1	18.1		0.355									П		Г		Т
Uranium-235	1	1.22	٥	0.061	2			1	Г		Г				Г		Т
Uranium-238	1	21.1		0.659	_		П		П				Г		Г		T
Neptunjum-237	1	2.17	U	0.033	2				Г						Г		
Plutonium-238	1	35.2	J	0	IJ										Г		
Plutonium-239/240	1	8320		0.086	U												П
Potessium 40		17.0		4.98				i	Г								П
Cobalt 60	0.05	U	U	U	دا				Г				Г		Г		
Costum 137	0.1	21200		0.540											Г		
Radium-226	0.1	U	υ	0.203													
Radium-228	0.2	U	IJ	0.246													
Europium 152	0.1	U	U	U	Ų				Γ				Г		Γ		П
Europium 154	0,1	61.9		U	U												
Europium 155	0,1	85.1		U	v												
Thorium-228(ges)		U	U	0.349					Г								
Thorium-232(gen)		U	U	0.248											Г		T
Uranium-238(gea)		U	_	U	Ū												$\Box$
Uranium-235(gea)		U		U	_												Н
Americium-241 (ges)		u u		บ	_										$\vdash$		Н

R107019-01

## DATA SHEET

B125X2

1	7027 Melissa C. Mannion	Client/Case no Contract		DG_H1409
		Client sample id Location/Matrix Collected/Weight Custody/SAF No	T-26/200 W 06/27/01 11:15 401.4	·· -

ANALYTE	CAS NO	RESULT pCi/g	2σ RRR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.466	0.94	1.6	400	ช	н
Carbon 14	14762-75-5	-0.955	2.7	4.6	50	υJ	C
Nickel 63	13981-37-8	-1.80	31	52	30	U	NI_I
Total Strontium	SR-RAD	49100	230	_11	1.0		SR
Americium 241	14596-10-2	227	19	4.1	1.0		AM
Technetium 99	14133-76-7	0.909	1.3	3.8	15	U	TC
Thorium 228	14274-82-9	4.09	4.7	6.5		u	TH
Thorium 230	14269-63-7	0.582	3.5	4.5	1.0	บ	TH
Thorium 232	TH-232	1.74	2.3	4.5	1.0	บ	TH
Total Uranium (ug/g)	7440~61-1	61.1	7.1	0.12	0.10	J	U_T
Uranium 233	U-233/234	18.1	6.1	3.8	1.0	<del></del>	บ
Uranium 235	15117-96-1	1,22	1.2	4.7	1.0	ช	บ
Uranium 238	U-238	21.1	6.2	3.8	1.0		U
Neptunium 237	13994-20-2	2.17	4.3	8.3	1.0	บ	NP
Plutonium 238	13981-16-3	35.2	15	18		Γ	PU
Plutonium 239/240	PU-239/240	6320	540	7.8	1.0	J	PU
Potassium 40	13966-00-2	17.0	5.2	4.5			GAM
Cobalt 60	10198-40-0	U		0.B5	0.050	U	GAM
Cesium 137	10045-97-3	21200	20	6.9	0.10		GAM
Radium 226	13982-63-3	ט		9.1	0.10	ซ	GAM
Radium 228	15262-20-1	ט		11	0.20	U	GAM
Europium 152	14683-23-9	Ü		20	0.10	Ū	GAM
Europium 154	15585-10-1	61.9	4.6	3.4	0.10	~	GAM
Europium 155	14391-16-3	85.1	8.0	12	0.10		GAM
Thorium 228	14274-82-9	ש		8.2	<del>-</del>	U	GAM
Thorium 232	TH-232	Ū		11		บ	GAM
Uranium 235	15117-96-1	Ü		19		บ	GAM
Uranium 238	U-238	` <del>u</del>		310		บ	GAM

200-TW-1 & 2 - Soil Sampling

per 12/4/01

DATA SHEETS Page 1 SUMMARY DATA SECTION Page 15

Lab id TMANC Protocol Hanford Version Ver 1.0 Form DVD-DS Version 3.06 Report date 08/15/01

R107019-01

DATA SHEET, cont

B125X2

	7027 Melissa C. Mannion	Client/Case no Contract	SDG H1409
•			

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	Test
Americium 241	14596-10-2	ប		300		ប	GAM

200-TW-1 & 2 - Soil Sampling

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 16

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.05
Report date 08/15/01

R107019-02

## DATA SHEET

B125Y4

4	7027 Melissa C. Mannion	Client/Case no Contract	11409
N. Control of the Con			SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pci/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	0.028	0.055	0.092	400	บ	н
Carbon 14	14762-75-5	1.23	2.6	4.2	50	υJT	C
Nickel 63	13981-37-8	0.487	1.4	2.3	30	บ	NI_L
Total Strontium	SR-RAD	0.026	0.16	0.33	1.0	ប	SR
Americium 241	14596-10-2	-0.005	0.050	0.092	1.0	ซ	MA
Technetium 99	14133-76-7	-0.007	0.17	0.58	15	U	TC
Thorium 228	14274-82-9	0.447	0.33	0.50		$\boldsymbol{\sigma}$	TH
Thorium 230	14269-63-7	0.284	0.32	0.39	1.0	ប	TH
Thorium 232	TH-232	0.365	0.24	0.31	1.0	<i>7</i> L_	TH
Total Uranium (ug/g)	7440-61-1	1.72	0.20	0.024	0.10	<b>T</b>	ד_ע
Uranium 233	U-233/234	0.355	0.20	0.19	1.0	j.	ຫົ
Uranium 235	15117-96-1	0.061	0.062	0.23	1.0	ט	U
Uranium 238	U-238	0.659	0.26	0.19	1.0	Jac.	Ū.
Neptunium 237	13994-20-2	0.033	0.067	0.10	1.0	ับ	NP
Plutonium 238	13981-16-3	0	0.057	0.22	1.0	UJ	₽U
Plutonium 239/240	PU-239/240	0.086	0.11	0.22	1.0	ָ ט	PU
Potassium 40	13966-00-2	4.98	2.6	0.43			GAM
Cobalt 60	10198-40-0	บ	•	0.041	0.050	ប	GAM
Cesium 137	10045-97-3	0.540	0.049	0.046	0.10		GAM
Radium 226	13982-63-3	0.203	0.11	0.080	0.10		GAM
Radium 228	15262-20-1	0.246	0.19	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.097	0.10	ប	GAM
Europium 154	15585-10-1	ប		0.12	0.10	บ	GAM
Buropium 155	14391-16-3	บ		0.075	0.10	Ū	GAM
Thorium 228	14274-82-9	0.349	0.073	0.046	<b></b>	-	GAM
Thorium 232	TH-232	0.246	0.19	0.17			GAM
Uranium 235	15117-96-1	U		0.13		ซ	GAM
Uranium 238	U-238	บ		4.7		บ	GAM

200-TW-1 & 2 - Soil Sampling

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ne 12/4/01

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Report date 08/15/01

R107019-02

DATA SHEET, cont

B125Y4

	7027 Melissa C. Mannion	Client/Case no Contract		SDG_H1409
		Client sample id Location/Matrix Collected/Weight Custody/SAF No	T-26/200 W 06/27/01 04:30 1890	

ANALYTE	CAS NO	RESULT pCi/g	26 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Americium 241	14596-10-2	บ		0.038		υ	GAM

200-TW-1 & 2 - Soil Sampling

per 12/4/01

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## Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Page 1 of 2

#### 1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1409 was composed of three solid (soil) samples designated under SAF No. B01-058 with a Project Designation of: 200-TW-1 & 2 - Soil Sampling.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

#### 2.0 ANALYSIS NOTES

## 2.1 Tritium Analyses

The matrix spike percent recovery (84%) was slightly below the 3 $\sigma$  limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). No other problems were encountered during the course of the analyses.

## 2.2 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

## 2.3 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

## 2.4 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

## 2.5 Total Strontium Analyses

No problems were encountered during the course of the analyses.

## 2.6 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses.

## 2.7 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

## 2.8 Total Uranium Analyses

No problems were encountered during the course of the analyses.

#### 2.9 Neptunium-237 Analyses

No problems were encountered during the course of the analyses.

## 2.10 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

## 2.11 Americium-241 Analyses

No problems were encountered during the course of the analyses.

Page 2 of 2

## 2.12 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

## **Case Narrative Certification Statement**

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion Program Manager

Date

Bechtel Hanford !	lne.	C	HAIN OF CUST	ODY/S	AMPLE	ANALY	YSIS	REQUEST	1	<b>10</b> 4	1-420-14	1	
Callector Thomas G./Watson D.			sany Contact Id, M.P.	Telephon (509)	ne No. 372-9631			Project Coords TRENT, 81	refor	Price Code	8N	Deta Tes	mat of the l
Project Designation 200-TW-1 & 2 - Soil Sampling		Seeng T-3	ling Location 26/200 W	4140	9 (71	027)		SAF No. B01-058		Air Qualit	<b>7</b> 🗆	45 ]	Days
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Collector Thomas G./Watson D./Figs	Gel.A.	Comp	my Contact d, M.E.	Telephon	e No. 72-9631			Project Con TRENT, SJ		Price Code	8N	Data Tu	percend
Project Designation 200-TW-1 & 2 - Soil Sampl	ing		ing Location 6/200 W	1409	1702	27)		SAF No. B01-058		Air Qualit	<b>y</b> 🗆	45 ]	Days
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C	•		No. of Container(s)	1	/	1		١٠ اه	3/	'	1	<u> </u>	
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812502	SOR.	06-27-01	-1115/							X		TIETO	BP(3)
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	151 1.50		<u> </u>	-2-01	73.5	- VOA - 22	204/44	ارسانية أرحا	والمتعولوه والرام	TOC+9000, PRI	-WITH D	[	0=08 A=46
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Relinquished By Removed From	Delatine 10	AV Received By Jins	dia SC-2 D	Ad Time		lamana Specicos na Spec - Add-c	rrepy (Ce on (Radio	eium-137, Cob m-226, Rodius	#1-60, Buropi  -226}; Insta	um-152, Burapium de Plutanium; Inde	-)54, Buropius pie Therium (1	155); horium-	Tollope The Toles Lolloped
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						Samples stared in Ref.# / Lat the							
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FINAL SAMPLE Disposed ) DISPOSITION	dehol			······································	•	Dispo	and By	<del></del>			<del></del>	Dute/Time	
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## Appendix 5

**Data Validation Supporting Documentation** 

## RADIOCHEMICAL DATA VALIDATION CHECKLIST

				<del></del>	
VALIDATION LEVEL:	Α .	В	(c)	D	Ε
PROJECT: 2	00-TW-	-1+2	DATA PACKAGE	: H-1407	
VALIDATOR:	TLI	LAB: ED		DATE: 27	)ec 0
CASE:			SDG: 11	409	
		ANALYSES	PERFORMED		
Modes Mapha/Bata	Continue 90	☐ Technetium-99	Alpha Spectroscopy	Germane Spectroscopy	
Total Uranium	☐ Redium-22	STrictum C14	XU1-63		
SAMPLES/MATI	RIX BIZ	5 X ?	B12544	<	soul
. Completes			······································		DAVA
1. Completer		_			/ ~
Technical ver	rification for	rms present?		Ye	s No N/A
Comments:					
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	······································				
2. Initial (	Calibration .	• • • • •	• • • • • • •	• • • • •	· · · · · · · · · · · · · · · · · · ·
Instruments/	detectors cal	ibrated withi analysis? .	n	٧٠	, No M/A
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		<u> </u>	<i></i>		

000021

## WHC-SD-EN-SPP-001, Rev. 1

3. Continuing Calibration					· · ^¥	N/A
Calibration checked within one week of sample	e anal	ysis?		. Yes	No/	N/A
Calibration check acceptable?					No	N/A
Calibration check standards NIST traceable?					No	N/A
Calibration check standards expired?				. Yes	No	N/A
Comments:						
					··········	<del></del>
4. Blanks				• • •	E	A/N C
Method blank analyzed?				.(Yes	No	N/A
Method blank results acceptable?				.(Yes)	No	N/A
Analytes detected in method blank?				. Yes	(No)	N/A
Field blank(s) analyzed?			• •	. Yes	(No)	NA
Field blank results acceptable?				. Yes	No	MAK
Analytes detected in field blank(s)?				. Yes	No	蜒
Transcription/Calculation Errors?				. Yes	No	(N/A)
Comments:	<u>,</u>	<u>.                                    </u>	·	<u>.                                    </u>		
					<del></del>	
5. Matrix Spikes			• •		[	⊐ N/A
Matrix spike analyzed?				. Yes	(No)	N/A
Spike recoveries acceptable?				( Yas	No	HYA
Spike source traceable?					No	
Spike source expired?				. Yes	No	
Transcription/Calculation Errors?				. Yes	No	MTA
Comments: No cy Ms - 3 a	ll					
: totur						
		<del></del>				
	···					

## WHC-SD-EN-SPP-001, Rev. 1

6.	Laboratory Control Samples .	•	•	•	•	•	•	•	•	•	•	•	•	•	.•	٠	•	□ N/A
LCS	analyzed?	•	•		•	•				•	•	•	•		.(	(Yes)	No	N/A
LCS	recoveries acceptable?	•	•	•	•	•	•		•	•	•	•	•	•	.(	YES	No	N/A
LCS	traceable?		•	•	•		•		•	•	•	•		•	•	Yes	No	WA
Tra	nscription/Calculation Errors?	•	•	•	•	•	٠	•	•	•	•	•	•	•	•	Yes	No	ATA
	Chemical Recovery																	
7.	Chemical Recovery	•	•	•	•	•		•	•	•	•	•	•	•	•	• • •	•	□ N/A
																_		
																	No	N/A
																	No	(N/B)
Cher	mical carrier expired?		•			•					•				•	Yes	No	AVA AVA
																	No	<b>F</b>
Сот	nents:			· · ·										-		-		
													_					
8.	Duplicates	•	•	•	•	•		•	•	•	•	•		•	•		•	□ N/A
Dup'	licates Analyzed?	•	•				•	•	•	•				.(	٠	yes	No	N/A
RPD	Values Acceptable?		•			•	•		•	•	•	•		•		Yes (	No	) N/A
Tra	nscription/Calculation Errors?		•	•	•	•	•	•	•	•	•	•	•	•	•	Yes	No	N/A
Com	ments: 002-63 ~ 457.		<u>، د</u>	لل	L				<u></u>				<del></del>			<del></del> .		
_		_						_										
										-			-		-			<del></del>

000023

	Field QC Samples
	ld duplicate sample(s) analyzed? Yes
	ld duplicate RPD values acceptable? Yes No ld split sample(s) analyzed? Yes (No
	ld split RPD values acceptable? Yes No
	formance audit sample(s) analyzed? Yes (No
Per	formance audit sample results acceptable? Yes No
Con	ments:
10.	Holding Times
Are	sample holding times acceptable? Yes No
	ments:
11.	Results and Detection Limits (Levels D & E)
Res	ults reported for all required sample analyses? (es) No
	ults supported in raw data? Yes No
	ults Acceptable?
11.9	nscription/Calculation errors? Yes No 's meet required detection limits? Yes No
MDA	<del>-</del>
	nscription/calculation errors? tes no
Tra	
Tra	ments: 1235 (cm) UP237 Ru 224 (224 Fuisz

Mn 000024

## Appendix 6

Additional Documentation Requested by Client

R107019-04

### METHOD BLANK

Method Blank

1	7027 Melissa C. Mannion	Client/Case no Contract		SDG H1409
Lab sample id Dept sample id		Client sample id Material/Matrix SAF No	<del></del>	SOLID

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	1.50	3.3	5.5	400	ט	H
Carbon 14	14762-75-5	-0.368	2.7	4.5	50	U	C
Nickel 63	13981-37-8	-0.882	30	_51	30	ט	NI_L
Total Strontium	SR-RAD	1.05	9.5	19	1.0	ប	SR
Americium 241	14596-10-2	1.42	2.8	5.4	1.0	U	AM
Technetium 99	14133-76-7	-0.556	1.0	3.6	15	U	TC
Thorium 228	14274-82-9	0.790	1.1	2.2		U	TH
Thorium 230	14269-63-7	-1.23	1.8	3.6	1.0	U	TH
Thorium 232	TH-232	0.175	0.53	0.67	1.0	U	TH
Total Uranium (ug/g)	7440-61-1	0	0.005	0.012	0.10	U	U_T
Uranium 233	U-233/234	1.07	2.1	4.1	1.0	บ	บ
Uranium 235	15117-96-1	0	1.3	4.9	1.0	ט	U
Uranium 238	U-238	0	1.1	4.1	1.0	ប	U
Neptunium 237	13994-20-2	1.03	2.1	2.8	1.0	ប	ИÞ
Plutonium 238	13981-16-3	-0.612	2.4	5.9	1.0	บ	PU
Plutonium 239/240	PU-239/240	1.84	2.5	4.7	1.0	ប	ប្រជ
Potassium 40	13966-00-2	U		3.6		U	GAM
Cobalt 60	10198-40-0	ប		0.31	0.050	U	GAM
Cesium 137	10045-97-3	U		0.32	0.10	U	GAM
Radium 226	13982-63-3	ซ	*	0.61	0.10	U	GAM
Radium 228	15262-20-1	<b>U</b> .		1.2	0.20	U	GAM
Europium 152	14683-23-9	บ		0.73	0.10	บ	GAM
Europium 154	15585-10-1	ซ		0.86	0.10	U	GAM
Europium 155	14391-16-3	ซ		0.52	0.10	U	GAM
Thorium 228	14274-82-9	ט		0.39		บ	GAM
Thorium 232	TH-232	ប		1.2		ប	GAM
Uranium 235	15117-96-1	บ		0.92		U	GAM
Uranium 238	U-238	U		37		ช	GAM
Americium 241	14596-10-2	Ū		0.64		ប	GAM

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BLANK, cont.

Method Blank

SDG <u>7027</u> Contact <u>Melissa C. Mannion</u>	Client/Case no Contract	SDG H1409
Lab sample id <u>R107019-04</u> Dept sample id <u>7027-004</u>	Client sample id Material/Matrix SAF No	SOLID

QC-BLANK 39162

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R107019-03

## LAB CONTROL SAMPLE

Lab Control Sample

SDG <u>7027</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> <u>SDG H1409</u> Case no <u>No. 630</u>
Lab sample id <u>R107019-03</u> Dept sample id <u>7027-003</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>SOLID</u> SAF No <u>B01-058</u>

ANALYTE	RESULT pCi/g	20 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pC1/g	Zơ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	485	11	5.4	400		Н	479	19	101	83-117	80-120
Carbon 14	10200	100	13	50		c	11300	450	90	85-115	80-120
Nickel 63	5920	130	62	30		NI_L	5800	230	102	83-117	80-120
Total Strontium	1200	34	9.9	1.0		SR	1100	44	109	82-118	80-120
Americium 241	458	19	1.6	1.0		AM	478	19	96	89-111	80-120
Technetium 99	809	23	3.7	15		TC	787	31	103	83-117	80-120
Thorium 230	534	19	3.7	1.0		TH	510	20	105	89-111	80-120
Total Uranium (ug/g)	71.5	8.3	0.12	0.10		U_T	72.0	2.9	99	77-123	80-120
Uranium 233	468	44	_21	1.0		υ	464	19	101	83-117	80-120
Uranium 235	374	39	4.7	1.0		U	378	15	99	82-118	80-120
Uranium 238	520	47	20	1.0		U	505	20	103	83-117	80-120
Neptunium 237	483	51	3.1	1.0		NP	530	21	91	83-117	80-120
Plutonium 238	632	62	5.1	1.0		PU	620	25	102	82-118	80-120
Plutonium 239/240	690	66	5.1	1.0		PU	660	26	104	82-118	
Cobelt 60	19.9	1.3	0.65	0.050		GAM	19.8	0.79	100	75-125	80-120
Cesium 137	20.9	1.1	0.85	0.10		GAM	20.5	0.82	102	75-125	80-120

200-TW-1 & 2 - Soil Sampling

	<u></u>			
QC-LCS 39161	1			

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R107019-05

DUPLICATE

B125X2

SDG 7027 Contact Melissa C. Mennion		Client/Case no <u>Hanford SDG H1409</u> Case no No. 630
DUPLICATE	ORIGINAL.	
Lab sample id <u>R107019-05</u>	Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>
Dept sample id <u>7027-005</u>	Dept sample id <u>7027-001</u>	Location/Matrix T-26/200 W SOLID
	Received <u>07/03/01</u>	Collected/Weight 06/27/01 11:15 401.4 g
% solids <u>92.9</u>	% solids <u>92.9</u>	Custody/SAF No <u>BD1-058-2</u> <u>BD1-058</u>

ANALYTE	DUPLICATE pCi/g	20 ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2ø ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	30 PR
Tritium	0.250	0.93	1.6	400	U	Н	0.466	0.94	1.6	Ų	-	
Carbon 14	0.257	2.6	4.3	50	IJ	C	-0.955	2.7	4.6	Ŋ	•	
Nickel 63	0.885	30	51	30	U	NI_L	-1.80	31	52	U	•	
Total Strontium	51000	230	9.7	1.0		SR	49100	230	11		4	21
Americium 241	204	33	7.6	1.0		MA	227	19	4.1		11	29
Technetium 99	2.08	1.1	3.2	15	U	TC	0.909	1.3	3.8	U	-	
Thorium 228	0.749	0.95	1.6		U	TH	4.09	4.7	6.5	U	-	
Thorium 230	-2.25	1.6	3.7	1.0	U	TH	0.582	3.5	4.5	U	•	
Thorium 232	0.749	0.55	0.65	1.0	J	TH	1.74	2.3	4.5	U	80	285
Total Uranium (ug/g)	61.5	7.1	0.12	0.10		U_T	61.1	7.1	0.12		1	31
Uranium 233	19.9	6.1	3.8	1.0		U	18.1	6.1	3.8		9	69
Uranium 235	1.80	2.4	4.6	1.0	U	υ	1.22	1.2	4,7	U		
Uranium 238	24.4	7.1	3.8	1.0		υ	21.1	6.2	3.8	-	15	63
Neptunium 237	1.88	1.9	2.8	1.0	U	NP	2.17	4.3	8.3	U	-	
Plutonium 238	22.3	13	19	1.0		PU	35.2	15	18	<del></del>	45	104
Plutonium 239/240	6380	680	20	1.0		PU	6320	540	7.8		1	23
Ruthenium 106	U		43		U	GAM	U				Ò	214
Antimony 125	U		25		U	GAM	U				O	214
Potassium 40	13.3	6.3	5.5			GAM	17.0	5,2	4.5		24	87
Cobalt 60	U		0.76	0.050	U	GAM	U		0.85	U		•
Barium 133	U		8.2		U	GAM	u			•	D	215
Cesium 137	21100	20	6.8	0.10		GAN	21200	20	6.9		o	32
Redium 226	Ü		8,9	0.10	U	GAM	U		2.1	u		<i>J</i> C
Radium 228	U		9.8	0.20	Ü	GAM	Ü		11	Ü	_	
Europium 152	Ū		20	0.10	U	GAM	U		20	Ü	-	
Europium 154	57.3	4.6		0.10	-	GAM	61.9	4.6	3.4	•	8	36
Europium 155	81.8	7.8	11	0.10		GAM	85.1	8.0	12		4	38
Thorium 228	U		8.1	77.5	U	GAM	U	-,-	8.2	u	-	30

200-TW-1 & 2 - Soil Sampling

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 12

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/15/01

R107019-05

DUPLICATE, cont.

B125X2

SDG 7027	· · · · · · · · · · · · · · · · · · ·	Client/Case no <u>Hanford SDG H1409</u>
Contact <u>Melissa C. Mannion</u>		Case no No. 630
DUPLICATE	ORIGINAL	
Lab sample id <u>R107019-05</u>	Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>
Dept sample id 7027-005	Dept sample id <u>7027-001</u>	Location/Matrix T-26/200 W SOLID
	Received <u>07/03/01</u>	Collected/Weight 06/27/01 11:15 401.4 g
% solids <u>92.9</u>	% solids <u>92.9</u>	Custody/SAF No <u>BD1-058-2</u> <u>BD1-058</u>

ANALYTE	DUPLICATE pCi/g	Zσ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pC1/g	GUAL1- F1ERS	RPD %	30 PROT TOT LIMIT
Thorium 232	U		9.8		U	GAM	U		11	u	•	
Uranium 235	υ		18		v	GAM	IJ		19	U	-	
Uranium 238	U		300		U	GAM	V		310	U	-	
Americium 241	U		290		U	GAN	U		300	U	-	

200-TW-1 & 2 - Soil Sampling

QC-DUP#1	39163				

DUPLICATES
Page 2
SUMMARY DATA SECTION
Page 13

Protocol Hanford

Version Ver 1.0

Form DVD-DUP

Version 3.06

Report date 08/15/01

R107019-06

MATRIX SPIKE

B125X2

SDG <u>7027</u> Contact <u>Melissa C. Mannion</u>	;	Client/Case no <u>Hanford</u> <u>SDG H1409</u> Case no <u>No. 630</u>
MATRIX SPIKE	ORIGINAL	
Lab sample id <u>R107019-06</u>	Lab sample id <u>R107019-01</u>	Client sample id <u>B125X2</u>
Dept sample id 7027-006	Dept sample id <u>7027-001</u>	Location/Matrix T-26/200 W SOLID
	Received <u>07/03/01</u>	Collected/Weight <u>06/27/01 11:15 401.4 g</u>
% solids <u>92.9</u>	% solids <u>92.9</u>	Custody/SAF No <u>B01-058-2</u> <u>B01-058</u>

ANALYTE		2ø ERR (COUNT)			QUALI- FIERS						REC 30 LMTS % (TOTAL)	
Tritium	720	7.3	1.6	400	x	H	857	34	0.466	0.94	84 86-114	60-140

200-TW-1 & 2 - Soil Sampling

QC-MS#1	39164			

MATRIX SPIKES
Page 1
SUMMARY DATA SECTION
Page 14

Lab id TNANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 08/15/01

Date: 10 December 2001

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: 200-TW-1&2 - Soil Sampling

Subject: Wet Chemistry - Data Package No. H1409-LLI (SDG No. H1409)

### INTRODUCTION

This memo presents the results of data validation on Data Package No. H1409-LLI prepared by Lionville Laboratory Incorporated (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B125X2	6/27/01	Soil	С	See note 1
B125Y4	6/27/01	Soil	С	See note 1

^{1 -} IC Anions - 300.0 (chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; pH - 9045C; nitrate/nitrite 353.2; chromium VI - 7196A.

Data validation was conducted in accordance with the BHI validation statement of work and the 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

## DATA QUALITY OBJECTIVES

### Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, sulphate, fluoride); 14 days for cyanide and total

organic carbon (TOC); 2 days for IC anions (nitrate, nitrite, phosphate); and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the samples being recieved at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J".

Holding times were met for all other parameters and samples.

### Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the target required quantitation limit (TRQL) to be acceptable.

All method blank results were acceptable.

#### Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

#### Accuracy

## Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125% (70-130% for TOC). Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% (30-69% for TOC) and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% (130% and 70% for

TOC) and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% (130% for TOC) and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J".

Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J".

All other matrix spike recovery results were acceptable.

#### Precision

## Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 35%. If RPD values are out of specification and the sample concentration is greater than five times the target required quantitation limit (TRQL), all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the TRQL and the sample concentration is less than five times the TRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 35% for positive sample results greater than five times the TRQL or plus or minus the TRQL for positive sample results less than five times the TRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were within the required control limits.

## Field Duplicate Samples

No field duplicates were submitted for analysis.

## Analytical Detection Levels

Reported analytical detection levels are compared against 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, DOE/RL-2000-38, Rev. 0, February 2001 target required quantitation limits (TRQL) to ensure that laboratory detection levels meet the required criteria. Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific TRQL.

### Completeness

Data package No. H1409-LLI was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

#### MAJOR DEFICIENCIES

None found.

#### MINOR DEFICIENCIES

Due to the samples being recieved at the laboratory without proper preservation (cooler temperature 17°C instead of 4°C), the TOC, ammonia, chromium VI and cyanide results in sample B125Y4 were qualified as estimates and flagged "J". Due to a matrix spike recovery of 0%, the chromium VI result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.4%, the nitrate/nitrite result in sample B125X2 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 73.3%, the phosphate result in sample B125Y4 was qualified as an estimate and flagged "J". Due to a matrix spike recovery of 74.8%, the chromium VI result in sample B125Y4 was qualified as an estimate and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Ammonia results in both samples were reported above the TRQL. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-2000-38, Rev. 0, 200-TW-1 Scavenged Waste Group Operable Unit and 200-TW-2 Tank Waste Group Operable Unit RI/FS Work Plan, February 2001.

## Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

  The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

# Appendix 2 Summary of Data Qualification

## **DATA QUALIFICATION SUMMARY**

SDG: H1409	REVIEWER:	DATE: 12/10/01	PAGE_1_0F_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
TOC Ammonia Chromium VI Cyanide	J	B125Y4	Sample preservation
Phosphate Chromium VI	J	B125Y4	Matrix spike recovery
Chromium VI Nitrate/nitrite	J	B125X2	Matrix spike recovery

## Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: BECHTEL-HANFORD				1																							
Laboratory: Lionville Laborator	y Inc.			1										•													
Case:		H1409		]																							
Sample Number		B1 25X2	2	B125Y4																							
Remarks																											
Sample Date		06/27/0	1	06/27/0	1																_						
General Chemistry	TROL	Rossit	Q	Result	α_	Result	a	Result	a	Result	<u>a</u> _	Result	٥	Result	a	Rosult	d	Result	a	Rosult	a	Result	Q	Result	a	Rosult	a
Chloride	2	3.6		2.6																							
Fluoride	5	168		9,5							$\Gamma_{-}$								Γ								
Nitrite	2.5	1.34	U_	1.32	U		Γ.																Г				
Nitrate	2.5	12.1		33.4					Ĭ																		
Cyenide, total	0.5	0.43	υ	0.41	w																						
Phosphate	5	13.1		2.5	J				Γ_																		
Chromium VI	0.5	4.2	J	0.87	J																						
Sulfate	5	11.2		22.0												Г <u></u>											
Nitrate/Nitrite	$\mathbf{I}$	3.4	7	8.7			[_		[	[	[_									<u> </u>	Γ						$\Box$
Ammonia, as N	0.5	5.3	U	5.3	w			i						[					Γ								
Total Organic Carbon		132	υ_	188	J																						
pH		8.8		9.9			L_												L								
									L		L																
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#### Lionville Labsboratory, Inc.

#### INORGANICS DATA SUNMARY REPORT 07/27/01

CLIENT: TNUHAMPORD 801-058 H1409 MORK ORDER: 11242-606-001-9999-00 LVL LOT #: 0107L231

					REPORTING	DILUTION
Sample	SITE ID	AMALYTE	RESULT	Units	LINIT	FACTOR
****		<b>不是在中国共和国的政治的企业的企业</b>	20165710	*****	*******	******
-001	B125X2	• Solids	93.4	•	0.01	1.0
		Chloride by IC	3.6	NG/KG	1.3	1.0
		Fluoride by IC	168	NG/KG	26.8	10.0
		Nitrite by IC	1.34 u	Mg/Kg	1.34	1.0
		Nitrate by IC	12.1	MG/KG	1.34	1.0
		Cymnide, Total	0.43 u	NG/RG	0.43	1.0
		Phosphate by IC	13.1	HG/KG	1.3	1.0
		Chromium VI	4.2 🎞	NG/KG	0.43	1.0
		Sulfate by IC	11.2	NG/KG	1.3	1,0
		Mitrate Mitrite	3.4 🎞	mg/kg	0.22	1.0
		Ammonia, as N	5.3 u	MG/KG	5.3	1.0
		Total Organic Carbon	132 u	MG/KG	132	1.0
		pH	8.8	SOIL PE	0.61	1.0

12/4/01

10/h/21

DITCLION

D. I TO'O BOIF BH 0.1 739 Total Organic Carbon 0.1 DX/DHC : E.8 N sa ,sincens €.8 001/0W 4.9 Mitrate Mitrice IZ.O DM/DN aulfete by IC 0 . I O. EE £.1 001/001 C 2.5 501/501 C 73.0 IN mutaoxida £.£ Spoephere by IC 0' T DON THE THE Chantde, Total TP'0 DOL/ON 0'1 1.32 P, EE HEERECO PA IC 7'33 # NG/103 Mittite by IC 3.0 1,32 **201/5W** Finoride by IC 3.5 chloride by ic T00-PACTOR LINIT STIME TAIURER BELLIAMA GI ELIS

> MONK ONDER: 17343-606-007-3333-00 CPIENL: LNCHYNAOND B01-028 H763

TAT TOL #: 0701F338

REPORTING

INORGANICS DATA SUMMARY REPORT 07/27/01

Lionville Labeboratory, Inc.

## Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



## **Analytical Report**

Client: TNU-HANFORD B01-058 H1409

LVL#: 0107L231

W.O.#: 11343-606-001-9999-00

Date Received: 07-05-01

#### **INORGANIC NARRATIVE**

1. This narrative covers the analyses of 1 soil sample.

- 2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
- 3. Sample holding times as required by the method and/or contract were met.
- 4. The cooler temperature was recorded on the chain of custody.
- 5. The method blanks were within the method criteria.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike (MS) recoveries were within the 75-125% control limits with the exception of Nitrate Nitrite that was below the control limits that may be attributed to sample inhomogeneity and Soluble Chromium VI MS recovery that was below the control limits that may be attributed to matrix interference to the potassium dichromate spiking solution.
- 8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Nitrate, Sulfate and Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.

The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 15 pages.



- 9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Deputy Laboratory Manager

Lionville Laboratory Incorporated

njp\i07-228







## **Analytical Report**

Client: TNU-HANFORD B01-058 H1409

LVL#: 0107L228

W.O.#: 11343-606-001-9999-00

Date Received: 07-05-01

## INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

- The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.
- 3. Sample holding times as required by the method and/or contract were met.
- 4. The cooler temperature was recorded on the chain of custody.
- 5. The method blanks were within the method criteria.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia was within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recoveries were within the 75-125% control limits with the exception of Insoluble Chromium VI that was above the control limits and Soluble Chromium VI and Phosphate that were below the control limits; poor matrix spike recoveries may be attributed to sample inhomogeneity.
- 8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit with the exception Total Organic Carbon (TOC) that may be attributed to sample inhomogeneity.
- 9. Results for solid samples are reported on a dry weight basis and TOC samples are dried prior to analysis.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels

Deputy Laboratory Manager

Lionville Laboratory Incorporated

37-30-

Date

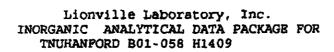
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The results presented in this report relate to the analytical testing and conditions of the samples upon receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

# Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01 LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	XTM	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001 MS	s	01LTZ019	06/27/01	07/18/01	07/20/01
PH	001	8	01LPH050	06/27/01	07/19/01	07/19/01
PH	001 RBP	S	01LPH050	06/27/01	07/19/01	07/19/01
₹ QC:						
				•		
CHLORIDE BY IC	MB1	s	01LICA45	N/A	07/10/01	07/10/01
CHLORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
FLUORIDE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRITE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
NITRATE BY IC	MB1 BS	S.	01LICA45	N/A	07/10/01	07/10/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	LCS L	S	01LCA67	N/A	07/09/01	07/09/01
TOTAL CYANIDE	MB1	S	01LCA67	N/A	07/09/01	07/09/01
PHOSPHATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
PHOSPHATE BY IC	MB1 BS	S	01LICA45	N/A	07/10/01	07/10/01
CHROMIUM VI	MB1	s	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BS	S	01LVIA61	N/A	07/20/01	07/20/01
CHROMIUM VI	MB1 BSD	S	01LVIA61	N/A	07/20/01	07/20/01
SULFATE BY IC	MB1	S	01LICA45	N/A	07/10/01	07/10/01
SULFATE BY IC	MB1 BS	s	01LICA45	N/A	07/10/01	07/10/01
NITRATE NITRITE	MB1	S	01LN3F39		07/18/01	07/18/01
NITRATE NITRITE	MB1 BS	S	01LN3F39		07/18/01	07/18/01
MMONIA	MB1	S	01LAM035	•	07/10/01	07/11/01
MMONIA	MB1 BS	S	01LAM035		07/10/01	07/11/01
AMMONIA	MB1 BSD	S	01LAM035		07/10/01	07/11/01
TOTAL ORGANIC CARBON	MB1	S	01LTZ019	· .	07/18/01	07/20/01
TOTAL ORGANIC CARBON	mbi bs	S	01LTZ019	N/A	07/18/01	07/20/01



DATE RECEIVED: 07/05/01

LVL LOT # :0107L231

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125X2						
* SOLIDS	001	s	01L%S083	06/27/01	07/06/01	07/07/01
* SOLIDS	001 REP	S	01L%S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	s	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	-01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 RBP	Ş	01LCA67	06/27/01	07/09/01	07/09/01
TOTAL CYANIDE	001 MS	S	01LCA67	06/27/01	07/09/01	07/09/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	s	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 REP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 REP	S	01LAM035	06/27/01	07/10/01	07/11/01
AMMONIA	001 MS	S	01LAM035	06/27/01	07/10/01	07/11/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

# Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B01-058 H1409

LVL LOT # :0107L228 07/05/01 DATE RECEIVED: MTX PREP # COLLECTION EXTR/PREP **ANALYSIS** CLIENT ID /ANALYSIS LAT # S 06/27/01 07/18/01 07/20/01 001 MS 01LTZ019 TOTAL ORGANIC CARBON 07/19/01 07/19/01 001 S 01LPH050 06/27/01 PH 001 REP 01LPH050 06/27/01 07/19/01 07/19/01 QC: CHLORIDE BY IC MB1 S 01LICA45 N/A 07/10/01 07/10/01 CHLORIDE BY IC MB1 BS S 01LICA45 N/A 07/10/01 07/10/01 FLUORIDE BY IC 01LICA45 07/10/01 MB1 S N/A 07/10/01 FLUORIDE BY IC MB1 BS S 01LICA45 N/A 07/10/01 07/10/01 NITRITE BY IC MB1 S 01LICA45 N/A 07/10/01 07/10/01 NITRITE BY IC MB1 BS S 01LICA45 N/A 07/10/01 07/10/01 NITRATE BY IC MR1 S 01LICA45 N/A 07/10/01 07/10/01 07/10/01 NITRATE BY IC MB1 BS S 01LICA45 N/A 07/10/01 S LCS L 01LC068 N/A 07/11/01 "OTAL CYANIDE 07/11/01 S OTAL CYANIDE LCS L 01LC068 N/A 07/11/01 07/11/01 TOTAL CYANIDE MB1 S 01LC068 n/a 07/11/01 07/11/01 MB1 S 07/10/01 PHOSPHATE BY IC 01LICA45 N/A 07/10/01 PHOSPHATE BY IC MB1 BS S 01LICA45 N/A 07/10/01 07/10/01 CHROMIUM VI MB1 S 01LVIA61 N/A 07/20/01 07/20/01 CHROMIUM VI MB1 BS S 01LVIA61 N/A 07/20/01 07/20/01 MB1 BSD CHROMIUM VI S 01LVIA61 N/A 07/20/01 07/20/01 S SULFATE BY IC MB1 01LICA45 N/A 07/10/01 07/10/01 SULFATE BY IC MB1 BS S 01LICA45 N/A 07/10/01 07/10/01 NITRATE NITRITE MB1 S 01LN3F39 07/18/01 07/18/01 N/A NITRATE NITRITE MB1 BS S 01LN3F39 N/A 07/18/01 07/18/01

S

S

S

S

S

01LAM036

01LAM036

01LAM036

01LTZ019

01LTZ019

AMMONIA

**AIMOMIA** 

**AIMONIA** 

TOTAL ORGANIC CARBON

TOTAL ORGANIC CARBON

MB1

MB1

MB1 BS

MB1 BS

MB1 BSD

07/18/01

07/18/01

07/18/01

07/18/01

07/18/01

07/19/01

07/19/01

07/19/01

07/20/01

07/20/01

N/A

N/A

N/A

N/A

N/A



## Lionville Laboratory, Inc. INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B01-058 H1409

DATE RECEIVED: 07/05/01

T.VT.	LOT	±	• 01	በግተ	.228

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B125Y4						
* SOLIDS	001	s	01L <b>%</b> S083	06/27/01	07/06/01	07/07/01
* SOLIDS	001 REP	S	01L <b>%</b> S083	06/27/01	07/06/01	07/07/01
CHLORIDE BY IC	001	\$	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
CHLORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
FLUORIDE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRITE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
TOTAL CYANIDE	001	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 REP	S	01LC068	06/27/01	07/11/01	07/11/01
TOTAL CYANIDE	001 MS	S	01LC068	06/27/01	07/11/01	07/11/01
PHOSPHATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 REP	S	01LICA45	06/27/01	07/10/01	07/10/01
PHOSPHATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
CHROMIUM VI	001	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 RBP	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MS	S	01LVIA61	06/27/01	07/20/01	07/20/01
CHROMIUM VI	001 MSD	S	01LVIA61	06/27/01	07/20/01	07/20/01
SULFATE BY IC	001	S	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 REP	\$	01LICA45	06/27/01	07/10/01	07/10/01
SULFATE BY IC	001 MS	S	01LICA45	06/27/01	07/10/01	07/10/01
NITRATE NITRITE	001	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 REP	S	01LN3F39	06/27/01	07/18/01	07/18/01
NITRATE NITRITE	001 MS	S	01LN3F39	06/27/01	07/18/01	07/18/01
AMMONIA	001	8	01LAM036	06/27/01	07/18/01	07/19/01
AMMONIA	001 RBP	S	01LAM036	06/27/01	07/18/01	07/19/01
ammonia	001 MS	S	01LAM036	06/27/01	07/18/01	07/19/01
TOTAL ORGANIC CARBON	001	S	01LTZ019	06/27/01	07/18/01	07/20/01
TOTAL ORGANIC CARBON	001 REP	S	01LTZ019	06/27/01	07/18/01	07/20/01

Bechte	Hanfor	d Inc.		CHAIN OF CUS	TODY/S	SAMPI	LE AN	LYS	IS I	REQUES'	Γ		В	01-058-14	Page 1	درع ته
Collector Thomas G./Watso	a D.		Com	pany Contact old, M.E.	Telepho				1	Project Coordi TRENT, 8J		Pri	ice Cede	8N	Data Tu	racround
Project Designation 200-TW-1 & 2 - 8		<b>.</b>		pling Location 26/200 W						SAF No. B01-058		Ai	r Qualit	<b>y</b> 🗆	45	Days
Ice Chest No.	-99-1	65 SML	142 Pleas	Logheek No. J. 1518		COA B20TW	1A44C		1	Method of Ship Fed EX	ment					
Shipped To- -THANKECRA				to Property No.	0104	28				BEE 1 2 2	357	<b>'</b> 2:	34.	552	<u>੫ /</u> ਤ	835
POSSIBLE SAMP	LE HAZAI	RDS/REMARKS		,		T		7					7			
Radioactive	COUNT	s: DickGrund D. Sheem Dost	SPLIT SPOON	Preservation	Cool 4C	Cool 40			Coal 40	: Nome	Hans				<u> </u>	1
Special Handlin				Type of Container	#G	#G		V	#G	∎G	•6	I				10
Sherter Hammi	g armer .	arre elec		No. of Container(s)	1	1			ļ	1	1	П		Samples sto	red in Re	(# Bat the
				Volume	500mL	1000mi	<b>(X)</b>	5	500enL	500mL	1000m	4		Collector n	ot availab	le to relengu
			See jaam (1) is Special Instructions	See item (2) Special Instruction	VOA CO	) <b>/</b>   4	itam (3) Ipocial Isosifica	Special	See hand Specia Jeaquain	D =		sampies on	<u></u>	for shipm		
•		sample ana	Ligio	•			8									
Sample No	a.	Matrix *	Sample Date	Sample Time												
B125Y4		SOIL	06-27-0	0439	K	X		·	Χ	X			•		TIETO	84575
			,		<u> </u>		$+\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$			<del>-</del>	4	_			`	13/263
						<del> </del>				_	<del>                                     </del>	-	· · · · · ·			
· · · · · · · · · · · · · · · · · · ·		<del> </del>	·			-	<del>-   </del>				/	-				
CHAIN OF P	OSSESSIO	N	Sign/Pri	nt Names	<u> </u>	SPI	ECIAL IN	TRUCT	TON	8	<b></b>				<del></del>	Matrix *
Relinquighed By Romov	red From	Deta/Time	Received By (1)		ete/Time 27-4 O	g20 (1)	ICP Metals	6010A (1	TAL)	(Cadmium, Chron	ism, Copp	er, N	ickel, Silver	); ICP Metals - 6	6010A	t-tul 10-teåmes
Reinjuished By/Remga		Date/Time 😂	CD True inply By St	MIR Thores	Time O	80 Þ.)	IC Anions -	300.0 (Ch	dende	cury - 7470 - (CV) , Fluoride, Nitrate, s - 9010; TOC - 90	Nitrite, Pl	osph	wie, Sulfate)	; Ammonia - 350	<b>.3</b> ;	30-4-84 Si-Glodge Wie Water
- COLLI	22	28 7.2·C	D Required By/Sh	vadia - A D	eto/Time	(3)	Semi-VOA	- 8270A (	Add-0	on) (Tributy) phos t List) (Aluminum	ebato); TP	H-Di	esel Rungo -		`~~~	O-OE A-Ak
Relimont by	7 1 1 2	7.2.01	1-6	Desp		Iro	n, Lend, Mag	eemm, M	langan	ese, Molybdecum, — 127, Caball 60	Nickel, Po	اندرماد	um, Silver, S	lodium Vanadiu		DO-Dous Solids DL-Osum Liquids T-Thums
Reliance By Roman	ad Franc	7/5/01 (01)	5 Vile	2/5/61 Remains	Vol 2	-   2		dd on (D)	وحتاء	226, 2-4	<del>Photopis</del>	-		io Tancinas (Ta		Warries Leliquid
Relinquished By/Remov	ed Prom	Date/Time	Received By/St		ste/Time		Total Urani	n, Thirt	بطلي	hot pic Union	-			A.	4	VeVeganing XeOther
Relinquished By/Remov	and From	Date/Time	Received By/Sk	ared in D	who/Time										L-53-01	
LABORATORY SECTION	Received By				Ti	ide							-	De	de/Time	
FINAL SAMPLE DISPOSITION	Disposal Me	thod			· · · · · · · · · · · · · · · · · · ·		Ī	isposed B	Y	· · · · · · · · · · · · · · · · · · ·				D	uto/Time	

		HAIN OF CUS	TODY/S	MPLE ANALYSIS REQUEST B01-058-2					d 1 €				
Collector Thomas G./Watson D. / Flant Gride R.	Comp	eany Contact dd, M.E.	Telepho				TRENT, 81 Proce OLA					27 Wasanii 2	
Project Designation 200-TW-1 & 2 - Soil Sampling	T-2	ling Location 26/200 W					SAF N B01-0		Air Quality				Days
Lice Chest Ind.		Logbook No. -1518	<u> </u>	COA B20TW1/	144C			od of Ship versenent \		mend objekte/Red EX			
Shipped To PT 6-28-01 RCCRA	Office	a Property No. RS	B.I	041	30		BE 0		A MAIN	·			
Possible sample hazards/remarks		1	1	1	1	1 )	]	,	]		1 /	1	1
Radioactive 55k dpm	ACTIVITY BUTTLES	Preservation	Coat 4C	Cool 4C	Cool 4C	Cod	C	Cool 4C	None	None	None	ļ	ļ
Special Handling and/or Storage	en cesú	Type of Container	_ *G	a.G	aG		1	aG ;	∎G	, sG	<b>1</b>	L	L
Shectas transming angula soot afe		No. of Container(s)	1	1	1	4		1	1	1	40		
		Volume	130mL	60mL	250mL	2	194	250mL	120mL	250ml.	Bhi	i !	
Sample ana	LYSIS		See item (1) in Special Instructions.	Chetenium Hex - 7196	See jiers (2) in Special Instructions.	VO.	) [	e jius (3) in Brecial astronicus.	See žint (4) Special Instruction	2 people	Activity Some		
Sample No. Matrix *	Sample Date	Sample Time							,				
B125X2 SOIL	06-27-01	1115	X	X	X			X	X			TIETO	<b>BP/98</b>
						<del> </del> -	_	•	-	•	1/1	•	<del> </del>
			<u> </u>	<u>                                     </u>	<u> </u>	<b>}</b> _		Sar	aples sto	red in Ref.		<b>.</b>	<del>}</del>
				<u> </u>							to relinquia		<u> </u>
			<u> </u>	<u> </u>	<u> </u>	<u>L</u>		528	nples on	7/2/2	(for shipm	nt. Etc	1
CHAIN OF POSSESSION	Sign/Prim				ial instr	UCTIO	NS					7.2	Matrix*
Relinquished By Removed From Date Time 0 8.			±0/Time∆ <u>%</u> 2.8•0	(1) 10						r, Nickel, Silver	}; ICP Metals -	601QA	3-tell Si-telmet
Bette omished By/Removed From Det Time 680			ate/Time	<b>800</b> (2) R		0 (Chlorid	ie, Fluor	ride, Nitroge	a in Nitrata,		rite, Phosphata,	Sulfate};	SO-tolk So-things
KLIN 2708 7/27			7.2.D							C - 9060; pH () Diesel Range		-	W = Water O=Oli
Rollygened By Rangeld Try To CA Dear Time Co	O Service Sylvenor	2 (/ D	ste/Time	(4) K	CP Motals - 601	OTR (Cli	est List)	{Aluminum	Basmuth, (	Cadmium, Calci	un, Chromium,		APAŽ DS=Drup Seji
	150	D	de/Time	- (S)	Lord, Magnetic Spectrus	nopp (Ca	DOSE, M	iciyodemira, <del>Z Cobali 60</del>	Nacioni, Pot	160, Europium	lodium, Vanadio 154, Davrjens I 16 Therina (Th	st, Zinc)	DL*Dram Lqu T*These
Reliablished Bufframoved From Detail Time 101/5	Receipted Byrotics	na 1 7/50		2323	- Sper - Add- American 24	- (Pletie 1: Carbon	#225, T .14, 14ap	(120 tar-218) Mariner 127	HEREFOR	روان ما چ <del>وران کا ان</del> اگران بیسترنیس کا	is Thering (T) L. Total Co. To		(riligid
Relinquished By/Removed From Date/Time	Received By/Stor		sto/Time	**** <b>*</b>	<del>nd Abasium, T</del>	ال-جسناني	D, toolo	of their	_	·	•	KT	V-Algorita 30-Other
Relinquished By/Removed From Date/Time	Received By/Ston	ed in D	ato/Time								(	1.28-01	1
LABORATORY Received By SECTION		<del></del>	Ti	le			·				D	ete/Time	

## Appendix 5

**Data Validation Supporting Documentation** 

## WHC-SD-EN-SPP-002, Rev. 2

## GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	С	D	E
PROJECT:	200-tw-1	+5	DATA PACKAGI	: H/Y08	
VALIDATOR:	TLI	LAB: LL		DATE: 2D	col
CASE:				4/409	
		ANALYSES	PERFORMED		
Aniene/IC	ртос	D TOX	☐ TPH-418.1	Oil and Greece	Alkelinity
Ammenia	D BOD/COD	Chloride	Michremium-VI	<b>英州</b>	שאיסיאסי
C) Sulfate	C) TOS	D TION	☐ Phosphate	recycliate	D
0	D	a	0		D
Is technical	rrative prese	documentatio	n present? .		Yes No N/A Yes No N/A
Comments:	olding times	acceptable?  Cooler  nex chro	17°	deal	(es) No N/A

000025

## WHC-SD-EN-SPP-002, Rev. 2

## GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION	
Was initial calibration performed for all applicable analyses? Yes	s No / N/A
Are initial calibration results acceptable? Yes	s No N/A
Was a calibration check performed for all applicable analyses? Yes	s No N/A
Are calibration check results acceptable? Yes	s No\N/A
Comments:	
4. BLANKS	<u> </u>
Were laboratory blanks analyzed? Ye	s) No N/A
Are laboratory blank results acceptable?	No N/A
Were field/trip blanks analyzed? Ye	
Are field/trip blank results acceptable? Ye	s No N/A
Comments:	
5. ACCURACY Were spike samples analyzed at the required frequency?	es No MA

1247

## WHC-SD-EN-SPP-002, Rev. 2

## GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:
7. ANALYTE QUANTITATION  Was analyte quantitation performed properly? Yes No N/A  Comments:
8. REPORTED RESULTS AND DETECTION LIMITS
Are results reported for all requested analyses?

x-th

## Appendix 6

Additional Documentation Requested by Client

4
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ο. τ	8,0	L.8	9L'9	ьк		
0'T	8.55	£9T	n ser	Total Organic Carbon		
0.1	<b>36</b>	4 6.8	u 6.8	M ea ,aircoman		
0.1	6'%	€.€	9 · E	Witzate Mirrite		
0.1	33'7	0.22	E. f.I	snytere by ic		
0.1	€,£	0.4	2.4	Chromium VI		
0.1	A, E	75°¢	1.61	Phosphate by IC		
0'1	ж	DFF.0	DEP.O	Cyanide, Total		
o't	22'3	72'¢	1.51	Mitrate by ic		
0.1	ж	4.344	T'S4N	Mittite by IC		
0.01	9157	786	760	Finoride by IC		
0.1	06.0	9.£	9.€	cproxide by IC		
7'0	r· t	P. P6	A. EQ	abilos #	BIJENI	42A100-
*******	*****	******			***********	*****
PACTOR (REP)	KPD	eselicate	linera	STYLANA	GI STIS	E78KFF
DIPALION			TAITINI			

CPIENE: INDHVMALOED BOT-028 H7409

NOSK ONDER: 77343-606-007-3332-00

INOEGRATICS DESCISION SESORE 01/11/01

ricualite rependence cory, inc.

#### Lionville Lababoratory, Inc.

APIKE#1 APIKE#2

#### INORGANICS DUPLICATE SPIKE REPORT 07/27/01

LIENT: THUHAMFORD B01-058 H1409

LVL LOT #: 0107L231

ORK ORDER: 11343-604-001-9999-00

CAMPLE CREEKE (LANKIE

SITE ID	AMALYTE	4RECOV	<b>trecov</b>	<b>t</b> DIFF
	*********			
01LAM032-MB1	Ammonia, as N	99.0	99.5	2.5

SHO

0 · I

PAF POL #: 0101F331

CCIENT: TRUHANDERD BOL-058 H1409

0. t	5 . 66	001	# 0.2	8.66	Azmenta, as N MSD		
0'1	0.86	700	u 0.4	0.86	M es ,aircount	OTTYNOSE-MET	<b>BIPMKT</b> 0
ο. τ	0.501	0.8	DOE.O	5.2	Microco Micrico	olinara-nbl	<b>BPYMK</b> TO
oot	t. Eat	OPLT	UG4.0	OELI	Insoluble Chromium VI		
0.1	4.04	0.4	DOF.O	3.ε	Soluble Chromium VI	TEN-T9VIATTO	OTHINWTO
0.1	<b>&gt;</b> 26	0.85	# E.E	2.66	sulfate by IC		
0.2	9.101	32'0	u E.E	25.4	Phosphate by IC		
0.1	T'00T	35.0	1,254	36.0	Micrate by IC		
0.1	*. >6	0.25	uer. I	33.6	NFERFE PÀ IC		
0.1	E. 601	0.03	D 8.2	9.45	Fluoride by IC		
O'T	6.EE	0.85	T.S T	8.55	chloride by ic	OJFICY42-MBT	BIYMKTO
0.1	1.26	0492	411	2570	Total Organic Carbon		
7.0	8.101	30€	u €.#	310	Amonia, se N		
2.0	P.EL	٤٠٤	7.€	£.7	Micrate Mitrite		-
2.0	8196	3.68	27.2	1.53	enttete by IC		
100	122.3	7370	2.3	7670	Insoluble Chromium VI		
1.0	0.0	6.4	5.3	τ.ε	sojnpje chrostna Al		
0.2	9'68	9 ° E5	t.et	1.18	Phosphats by IC		
0.1	9.36	26.5	ner.0	97.E	Cymride, Total		
0. E	6'DDT	3, 68	I.EI	I.33	NIERWED PÀ IC		
0.5	0.88	9.52	T°3¢n	1.74	HIFEIFF PA IC		
0'01	£.80£	909	#9 T	184	Fluoride by IC		
0. £	£. £6	9.63	3.E	P. £8	cyfoxiqe ph ic	BIJENJ	-00 <i>1</i>
	<b>4440</b>	- +00=	******	***			*****
PACTOR (RPK)	<b>Y</b> \$CQA	ANOUNT 4	TIUSER	BYNDI'E	ANALYTE	GI STIS	Rights
DITALION		GENIGE	Trilini	Genics			

Signification of the state of

INORGANICA ACCURACY REPORT 07/27/01

Lionville Lababoratory, Inc.

#### Lionville Lababoratory, Inc.

#### INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

CLIENT: THUHAMFORD B01-058 M1409 MORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L231

					reporting	dilution
Bample	SITE ID	ARALYTE	R被移动社工	UNITE	LIMIT	FACTOR
******		<i></i>	******	*****	*****	
BLANK(10	01LICA45-MB1	Chloride by IC	1.2 u	NG/KG	1.2	1.0
		Fluoride by IC	2.5 u	MG/KG	2.5	1.0
		Nitrite by IC	1.25 u	NG/KG	1.25	1.0
		Nitrate by IC	1.25 u	MG/KG	1.25	1.0
		Phosphate by IC	1.2 u	HG/KG	1.2	1.0
		Sulfate by IC	1.2 u	MG/KG	1.2	1.0
Blank1	01LCA67-WB1	Cyanide, Total	0.50 u	MG/KG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0,40 u	на/ка	0.40	1.0
BLANK10	01LN3F39-HB1	Nitrate Nitrite	0.20 u	на/ка	0.20	1.0
.ank10	01Lang35-NBI	Ammonia, es N	5.0 u	NG/KG	\$.0	1.0
BLANK10	01LTZ019-HB1	Total Organic Carbon	30.0 u	MG/KG	20.0	1.0

#### Lionville Lababorstory, Inc.

#### INORGANICS METHOD BLANK DATA SUMMARY PAGE 07/27/01

CLIERT: THURANFORD B01-058 H1409 MORK ORDER: 11343-606-001-9999-00 LVL LOT #: 0107L228

			-		REPORTING	DILUTION
Sample	SITE ID	ANALYTE	RRSULT	UNITS	LIMIT	PACTOR
2007777	**************	#########################			70#4##### <b>*</b>	25-22-22
BLANKIO	Ollica45-MB1	Chloride by IC	1.2 u	MG/KG	1.2	1.0
		Fluoride by IC	2.5 u	MG/KG	2.5	1.0
		Mitrite by IC	1.25 2	MG/KG	1.25	1.0
		Nitrate by IC	2.25 u	NG/KG	1.25	1.0
		Phosphete by IC	1.2 u	MG/RG	2.2	1.0
		Sulfate by IC	1.2 u	NG/KG	1.2	1.0
BLANKI	01LC068-NB1	Cyanide, Total	0,50 u	MG/XG	0.50	1.0
BLANK10	01LVIA61-MB1	Chromium VI	0.40 u	MG/KG	0.40	2.0
BLANK10	01LH3F39-MB1	Mitrate Mitrite	0.20 u	na/ka	0.20	1.0
NR20	011AN036-NB1	Ammonia, as X	5.0 u	HQ/109	5.0	1.0
diank10	01LT8019-MB1	Total Organic Carbon	20.0 u	NG/KG	20.0	1.0

0.1

0.T

J.0

700

8.86

0.96

0.fot 0.2

r.cor

## Licentile Lababoratory, Inc.

## INCREMINICS ACCURACY REPORT 07/27/01

7'0	7.06	0.1	104.0	9, E	Soluble Chromium VI	otent <b>ye</b> t-mbt	ВГУИКТО
0.1	P.56	0.25	u s.r	1,62	Sultate by IC		
0.1	B. for	0.25	u s.s	P. GZ	Phosphace by ic		
G.I	1.001	35.0	445.1	0.85	Miczese by ic		
0.1	1.16	0.25	UZS.I	3.55	HIERTED PA IC		
J.0	2.60t	0.02	u 2.5	9.75	Ajnoziqe pa ic		
0.1	6.56	28.0	u E.2	33.5	curoxiqe ph ic	Officyes-Mbt	BEYMECTO
Q'T	1.56	3420	188	3650	Total Organic Carbon		
0.1	100	210	# E.2	310	Mamonita, as N	•	
2.0	8,74	6.8	4.4	11.3	Microco Micrico		
9.5	3.68	0 . E2	a. ££	7.69	Z Sulfate by IC		
500	139.0	7330	48.0	DEST	Insoluble chromium VI		
0'T	8.57	£'}	78.0	0.4	sejnpje chkowine Al		
5'0	£. £7	0 ES	3.5	9'TP	Phosphate by IC		
0.1	87'3	66'7	uth.0	88.5	Cyanide, Total		
2.0	7.56	0,52	33.4	0.58	Miczece by ic		
9.2	0.66	0 : CS	u\$5.1	E.44	ntextee by IC		
0.2	105.0	TOC	5'6	272	synostyce ph ic		
9.2	1.06	0.63	9.2	£.08	cyloride by IC	B732X4	100-
			2 William 4 2 2 4			*****	****
SYCLOW (WBK)	PACECOA	MOONE	TAURES	S.ITMAR	ETYLANA	di gria	BJUMAS
DITCLION		GENIES	TYILINI	CEDITAR			
					00	-6666-T00-909-EPETT :W	NONTK ONTO

56C

0.34

0.94

5.2

Total Organic Carbon

Immostable chromium vi 1190

dan M as ,atmosmal

Amenda, as H

Mitrate Mitrite

TEM-6TORLTTO

TEM-SCOMPTTO

TEN-CCAEMPITO

CTIENL: IMPRIMATED BOT-DES HT409

BLANKLO

BLAMKLO

**BEYNNETO** 

n 0.02

# O'f

0.40u 1740

TAT TOL #: 0101F338

U 0.4

405.0

001

100

TOO

#### Lionville Lababoratory, Inc.

#### INORGANICS DUPLICATE SPIKE REPORT 07/27/01

CLIENT: THUHAMPORD B01-058 H1409

LVL LOT #: 0107L228

WORK ORDER: 11343-606-001-9999-00

SPIKESI SPIKES2

Sanple	SITE ID	ANALYTE	<b>VRECOV</b>	PERCOA	*DIPP
******	**********				
BLANKIO	01LAN036-NB1	Ammonia, as N	96.0	96.0	0.00

## .oni ,ysosasodadal elikuoti

## INOMORPHICE EMECIATION MEDOMI 01/31/07

TAT TOL #1 DIDLEGES

NOWN ONDER: 11343-202-007-3333-00 CPIENA: LANHVALOND B07-028 H1403

0.1	t'o	616	****	rd.		
0.1	\$*TE	461	***	Total Organic Carbon		
0.1	DMC	n 2.2	n E.E	Ammonia, as W		
9.1	£'21	4.2	۲.9	Mitrate Mitrite		
0.1	€.3	8.0E	0.52	anytate ph IC		
0.1	#·2	48.0	78.0	Chromium Vi		
0.1	02.0	4.2	2.5	Phosphate by IC		
0.1	ЭMC	nts.0	UIP.O	Cyanide, Total		
0.1	9.8	3.15	> . EE	Mickete by IC		
0.1	266	use.1	pse.1	Mirzice by IC		
0.1	30.4	3.8	314	Pluoride by IC		
0.1	5.1	2.2	2.6	chioxide by ic		
0.5	£.£	9.84	3.34	epilos 4	PZSETE	dertoo-
22424224000	4450W#W	4524444		***************		******
PACTOR (REP)	<b>G48</b>	REPLICATE	1/100EX	SLITVNY	di <b>et</b> ie	<b>B</b> 14MAR
DITOLICA			THILLINI			

DX.